

MARINE REVIEW

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PROMISING OUTLOOK IN THE IRON INDUSTRY.

Representatives of the leading iron ore sales agencies in Cleveland have been making some careful calculations regarding the output of Lake Superior ore during the present season and the consumption during the year, May 1, 1898, to May 1, 1899. Their conclusions will not be given out as yet, owing to several elements of uncertainty, but it may be said that the outlook for another year, based on these calculations, is decidedly encouraging to ore interests, and therefore encouraging also to owners of vessel property. It is now more than probable that this season's output of ore from the old ranges, both Bessemer and non-Bessemer, will fall 1,500,000 gross tons short of the estimated output. It is also certain that for the first time in many years the consumption of Lake Superior ore will exceed production, and it is confidently expected that instead of 3,500,000 tons or more of ore on Lake Erie docks next May, the stock piles on these docks will not exceed 1,500,000 tons, or less than what would be required in the conduct of a business that demands a variety of stocks and a fair surplus over actual requirements. These statements are based on figures covering ore on dock at the opening of navigation; on estimates of ore being consumed by all furnaces using the Lake Superior product; on sales of ore to go east of the Alleghenies, and on close estimates of this season's output, made from a knowledge of ore shipped thus far. Full 1,000,000 tons of Lake Superior ore will go east of the Alleghenies this year, and non-Bessemer ores of the old ranges were never sold up as they are at present.

The ore business for the present season is practically at an end, except as regards the tonnage that is still provided for by contract vessels. The situation is such, of course, that any great slump in grain freights would result in considerable wild chartering for ore, but a marked falling off in the grain rates is not expected. There are too many vessels chartered for November loading of grain to expect a decline in rates sufficient to greatly increase the ore output.

ORDERS FOR NEW SHIPS.—THE MITCHELL STEAMER.

None of the representatives of large interests in ore, like the Bessemer Steamship Co. and Pickands, Mather & Co. of Cleveland, have as yet begun preparations for the construction of new vessels, and it is the general opinion that they will do little in the way of new vessels during the coming winter, notwithstanding the improved condition of freights and the prospects for an active season in 1899. Prices asked by the ship builders are, of course, considerably higher than they were a few months ago, on account of the advance in material, and all building will be delayed by slow delivery of material. These conditions are not of a kind to prompt the big ship-owning companies to place orders for new ships, but there will nevertheless be work enough in all the yards.

In answer to inquiry made by the Review, Gen. Mgr. Geo. L. Douglas of the Western Transit Co., Buffalo, who is very much pleased with the steamer Troy, recently completed by the Detroit Dry Dock Co., says his company has under consideration the question of building another steamer, but it has not yet been decided. Representatives of two coal shipping concerns and one of the leading vessel brokers of Duluth are interested with Capt. John Mitchell of Cleveland in the steel steamer for which he placed an order on Tuesday last with the Globe Iron Works Co. of Cleveland. The new steamer will be 2 feet longer than the Holden, also owned by John Mitchell and others, but otherwise a duplicate of that vessel. Dimensions are 430 feet over all, 410 feet keel, 50 feet beam and 28 feet depth. She will have quadruple expansion engines and three 12-foot boilers fitted with Ellis & Eaves induced draft. Steel for this vessel will be furnished by the Shoenburg Steel Co. of Pittsburg.

About 500 men have been placed at work in the ship yard of James Davidson, West Bay City, Mich. The work of preparing timber for two large wooden schooners to be built during the winter is well under way.

ENERGY OF THE WILLIAM R. TRIGG CO.

Government officials who doubted the ability of the William R. Trigg Co. of Richmond, Va., to get their ship yard in operation so as to fulfill, in the stipulated time, their contract with the government for the construction of several torpedo boats and torpedo boat destroyers, will probably be surprised by the energy displayed in affairs of the new concern. President J. W. Duntley of the Chicago Pneumatic Tool Co. has contracted to supply the yard with a full outfit of pneumatic tools, including air compressor, and Chamberlain & Scott of Richmond have the contract for bending and straightening slabs. Pile driving has been started and the various buildings will be well on toward completion by the end of the month. Several hundred of the piles required are from 30 to 60 feet in length and 14 inches in diameter. The sub-contractor who is furnishing the piles received inquiry Oct. 10; bought the trees, Oct. 11; received order, Oct. 12; began delivery Oct. 13, working double gangs of men and delivering eighteen piles per day. The order for extra length timber required for the mould loft was given on the evening of Sept. 30, and four carloads were received Oct. 9. This timber was cut in North Carolina from trees that were standing in the woods Oct. 3.

Hon. James Fisher of Winnipeg, who went in 1897 as a commissioner from the Province of Manitoba on a government expedition sent into Hudson's bay to report on its feasibility as a shipping route for the produce of the northwest, has about completed his report. Mr. Fisher has collected considerable information on the subject of ice-crushing steamers in lake service to be embodied in this report. It would seem from the drift of inquiry in correspondence which he has had with Harvey D. Goulder and other representatives of shipping interests on the lakes that his report will not be favorable to the Hudson's bay route.

CARNEGIE ON SHIP BUILDING.

THE GREAT STEEL MANUFACTURER MAKES SOME INTERESTING PREDICTIONS REGARDING THE DEVELOPMENT OF THE INDUSTRY IN THIS COUNTRY.

Andrew Carnegie returned from Europe, a few days ago, and in answer to inquiries regarding reports of his connection with the project for the establishment of a great ship building plant at New York, he said he had no interest in any company that was being formed for that purpose but was certain that the enterprise, if rightfully handled, would be successful. Mr. Carnegie is quoted as follows in one of the Philadelphia papers:

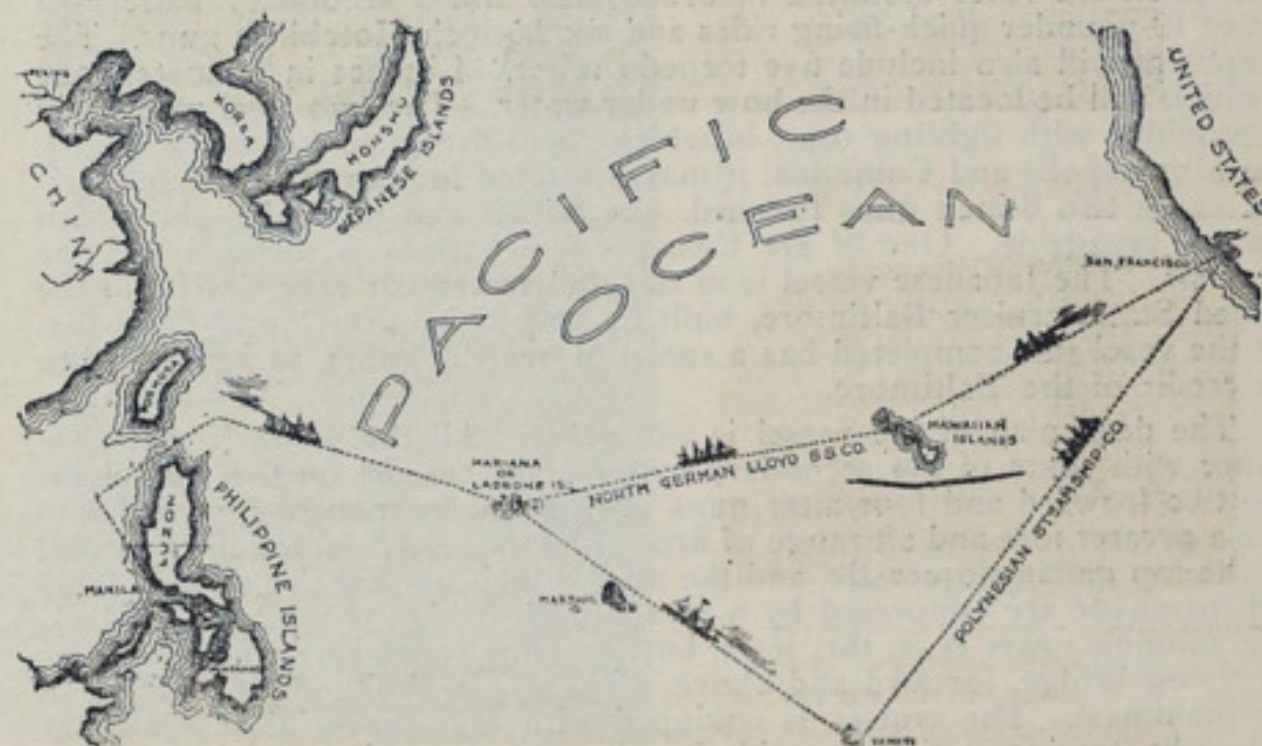
"Yes; I called the attention of the western ship builders to the opening presented for a great ship yard in New York nearly two years ago, and I have had letters from several upon the subject. I know also of a leading ship building concern in Great Britain which is considering the matter. It is obvious to any man that the United States is going to resume its original position as the chief ship building nation of the world. What is the use of sending thousands of tons of steel to Glasgow and Belfast, as we are doing, when we might as well build the ships here and send them? A ship builder in this country today has the advantage of about \$4 per ton in cost of all steel materials, and he has all his woodwork cheaper than builders in either Great Britain or Germany, and if he cannot take the ship building trade of the world what is the matter with our ship builders? I do not forget that we have three very creditable ship yards now—Newport News, one of the best in the world; Cramps', in Philadelphia, and Scott's, in San Francisco; these three ship yards will, of course, extend and prosper, but there is plenty of room for another ship yard here."

"Is there no way in which you could aid a new ship building enterprise?" he was asked.

"My heart is in seeing the United States resume her former position, as I have said, the foremost ship building nation of the world. It is upon the cards. I believe that the Carnegie Steel Co. would contract with any responsible ship building company to furnish it all of its steel at several dollars per ton less than any ship yard in the Old World is able to obtain it, and this for any number of years that the concern may desire. Steel is bound to be cheaper in this country than in any other country. Great Britain has no supply of raw materials to make steel, her coal is getting dearer, her ore is nearly exhausted. Germany never could make steel and deliver it to the shipyard as cheaply as Great Britain. The whole ship-building business of the world lies open to the United States, and this will become more and more apparent with every succeeding year. We have the raw materials, and no other country possesses them to such an extent."

TWO NEW PACIFIC STEAMSHIP LINES.

Shipping circles throughout the Pacific coast cities are deeply interested in the talk regarding the establishment of two new steamship lines between Pacific coast ports and the orient. The routes at present marked out for the steamers of these two new lines are shown in the accompanying sketch. The establishment of a regular service by the Polynesian Steamship Co. would appear from all indications to be a practical certainty, but much more of the problematical attaches to the project for the institution of a service by the North German Lloyd Co. The Polynesian company,



as has before been stated in these columns, is under the direction of such men as Messrs. Hatch & Foote and Charles R. Flint of New York city, Edward S. Cramp of the Wm. Cramp & Sons Ship & Engine Building Co., William M. Ivins, R. A. Smith of the American Mail Steamship Co., J. Lamb Doty, formerly consul to Tahiti, and others. It is understood that two steamers will be chartered, pending the construction of several vessels at the Cramp yard in Philadelphia, and a regular monthly service instituted in the very near future. The French government grants a subsidy of \$100,000 per annum for the new line, and it is expected that mail subsidies will be given by the United States government. Officials of the North German Lloyd Steamship Co. state that the project for the establishment of a service under their auspices is yet in embryo, and there is every reason to believe that this represents the actual condition of affairs, although representatives of the company have recently visited various Pacific coast ports for the purpose of investigating the outlook.

John H. Dialogue, aged sixty-eight, senior member of the ship building firm of John H. Dialogue & Sons, Camden, Me., died Sunday.



PHOTO BY RAV.

JAPANESE CRUISER KASAGI—BUILT BY THE WM. CRAMP & SONS SHIP AND ENGINE BUILDING CO.

JAPANESE CRUISER KASAGI.

THE SPLENDID COMMERCE DESTROYER RECENTLY COMPLETED BY THE WM. CRAMP & SONS SHIP & ENGINE BUILDING CO. OF PHILADELPHIA.

A considerable degree of attention has been attracted by the acquisition by the Japanese government during the past few years of a navy, which, considering its size, probably has no superior afloat. Something of more significance than a passing compliment attaches, therefore, to the declaration of the best informed officers of the Japanese navy that the protected cruiser Kasagi, just turned over to representatives of the Japanese government by the William Cramp & Sons Ship & Engine Building Co. of Philadelphia, surpasses their expectations in every respect and is in every way a credit to their fleet. The most competent naval architects and marine engineers of this and other countries who have inspected the vessel have shared this opinion most unqualifiedly. She is the equal, they say, of anything of her class as yet turned out by European builders. Better still, the record of her trial trip evidences the fact that all these encomiums are justified.

The Kasagi, which has been referred to in some instances as an armored cruiser, is in reality a protected cruiser of the second class, and, like all vessels of her type, has no defensive armor, relying on her coal bunkers, which run 108 feet fore and aft of her amidship section, to protect her engines, which are entirely below the water line. The cruiser is 374.5 feet over all, 48.75 feet breadth of beam, 30 feet deep, and has a displacement of 4,900 tons on a draught of 17 feet 9 inches. The protective deck has a maximum thickness of 4.5 inches on the slopes and 1.75 inches on the flat. The motive power is supplied by two vertical, inverted, triple-expansion four-cylinder engines, driving twin screws, and capable of developing under forced draught a speed of 22.5 knots per hour. The engines have 17,000 indicated horse power, and there are twelve single-ended cylindrical boilers, each 14 feet 2 inches in diameter and 9 feet 9 inches in length. These boilers are in three compartments and there is a smaller auxiliary boiler above the protective deck. The grate surface is 920 and the heating surface 26,000 square feet.

The armament of the Kasagi, to be supplied by Japan and to secure which the cruiser is about to depart for England, will be heavier than that

knots under natural draft. Revolutions of the screws rose from 158 at the beginning to 164 at the close. This was accomplished with an even pressure of steam and an air pressure of about 1½ inches in the fire rooms. Following the regular trial the condition of the machinery was demonstrated by a series of progressive trials with the speeds recorded at 80, 125, 150 and 160 revolutions. The manoueuvering ability of the cruiser was also determined by a complete test. With full speed, thirteen revolutions per minute of the engines, complete circle to starboard, the time was 4 minutes 15 seconds; with the same conditions, but going to port, 4 minutes, 16 seconds; circle in each case was less than 300 yards; full speed ahead, reversing and coming to complete stop, 2 minutes, 25 seconds, or in the vessel's own length.

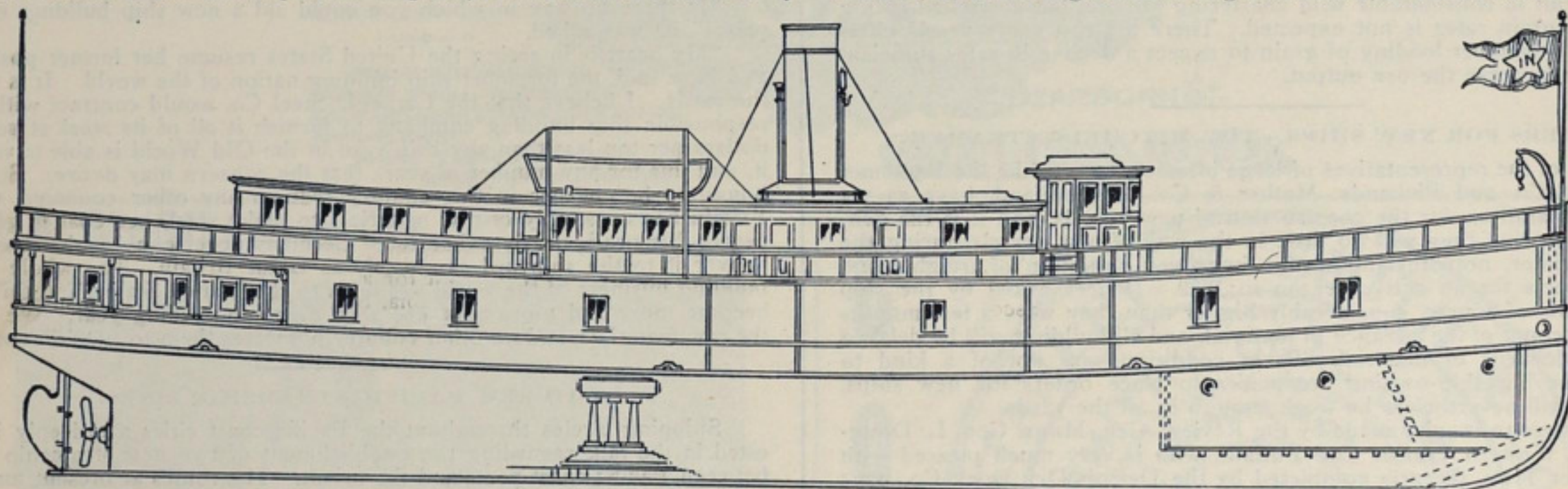
Increased credit is due to the Cramp company in view of the fact that the Kasagi was completed full six months ahead of the contract time, believed to be the first case of the kind on record. The United States government made an unsuccessful effort to purchase the cruiser at the outbreak of the war. The excellent picture of the Kasagi, presented as a supplement with this issue of the Review, is from a photograph taken while the vessel was lying in the Delaware river just prior to her departure for New York, whence she goes direct to England.

THE POSTMASTER GENERAL.

NEW MAIL VESSEL FOR SERVICE IN NEW YORK HARBOR NOW NEARING COMPLETION AT THE YARD OF THE ROBERT PALMER & SON CO., NOANK, CONN.

The work of transporting the mails from incoming ocean steamers to New York city has gradually assumed such proportions as to emphasize the inadequacy of the present facilities, and it is to remedy the existing conditions, as well as to meet any demands that may arise for some years to come, that Howard Carroll is having constructed by the Robert Palmer & Son Ship Building & Marine Railway Co. of Noank, Conn., a mail boat which will typify the highest degree of development in craft of this class.

The vessel, which will be known as the Postmaster General, will be 151 feet over all, 28 feet 9 inches beam and 10 feet 9 inches deep; gross registered tonnage, 419; net, 285. This steamer is especially constructed with a view to handling and assorting mail matter, and has two mail hatches



MAIL STEAMER POSTMASTER-GENERAL, BUILT BY THE ROBERT PALMER & SONS CO., NOANK, CONN.

of the cruisers Minneapolis or Columbia, the commerce destroyers of the United States navy. There will be two 8-inch rifles at the sides, ten 4.7-inch quick-fire rifles mounted in broadsides, and a secondary battery of twelve 12-pounder quick-firing rifles and six 2.5-inch Hotchkiss guns. The equipment will also include five torpedo tubes, 14 inches in diameter, one of which will be located in the bow under water. The two steel masts will be provided with fighting tops, in which rapid-fire guns will be mounted. The Minneapolis and Columbia, it may be stated for purposes of comparison, carry two 6-inch guns forward, one 8-inch gun aft and eight 4-inch guns in broadside. One of the Kasagi's 8-inch guns is forward and the other aft. The Japanese vessel is in size and armament very similar to the United States cruiser Baltimore, built in 1888-89 by the Cramp company, but the vessel just completed has a speed of over 22 knots, as against 16 to the credit of the Baltimore.

The deck plan of the vessel is admirable. All the 4.7-inch guns, together with some of the secondary battery, are carried on the spar deck. The two forward and four after guns are carried in sponsons, in order to give a greater fore and aft range of fire. The forward 8-inch gun is carried on the top gallant foremast, and the after 8-inch gun on the poop. Poop and foremast are connected by a fore-and-aft bridge over the spar deck. The conning tower is on this level, but the pilot house is on the level with the flying bridge, forward and above. There is a similar flying bridge at the mainmast. The cruiser is equipped with four powerful searchlights, and eight steering stations provide for almost any contingency in handling the vessel. The use of wood in the construction of the vessel has been reduced to a minimum. All the partitions in the officers' quarters are of thin steel in accordance with the latest designs.

The contract for the Kasagi was signed with representatives of the Japanese government Dec. 31, 1896, and the launch of the vessel, Jan. 20, 1898, attracted international attention, by reason of the fact that she was the first foreign warship launched in America since the Russian warship Zabiaca, built by the Cramp company in 1878. The Japanese cruiser Chitose, a vessel of the same class as the Kasagi, was launched by the Union Iron Works, San Francisco, two days after the launch at the Cramp yard. The Union Iron Works cruiser is a little longer than her sister vessel but draws slightly less water.

The trial trip of the Kasagi took place over a 40-mile course off the Massachusetts coast last July. A strong cross tide and other unfavorable circumstances made the conditions for the trial of a rather unsatisfactory nature, and yet the cruiser developed a speed of 21.68 knots under natural draft and 22.76 knots under forced draft, the contract calling for only 20.50

and numerous mail chutes, extending from the upper to the lower deck, together with a capacity for storing and sorting at least 3,500 bags of mail at a trip. The frame and planking is of selected white oak, the knees of hachmatack, decks of yellow pine with steel frames, and the joiner work of the saloon and cabin of polished sycamore. The engine, built by John W. Sullivan of New York city, will drive the vessel at a speed of 19 knots. Two boilers will be of the Heipershhausen pattern, furnishing steam at 250 pounds pressure. The entire main deck of the vessel will be given over to facilities for assorting and storing mail matter, and arrangements will be made so that it may be strongly illuminated at night with electric lights. On this deck accommodation is provided for six officers of the postoffice service and six mail handlers, while in the forecabin, forward and below decks, quarters are provided for a crew of sixteen men.

The Palmer company, which has the Postmaster General under construction, has had the capacity of its plant tested for some time past by the orders in hand. The Old Glory, a twin-screw steamer 140 feet in length, 27 feet beam and 10 feet deep, with triple-expansion engines, has just been completed, and the last of ten 1,600-ton barges building for the Reading Co. of Philadelphia left the Noank yard this week. Among other vessels constructed recently by the Palmer company are five railroad floats, two lighters, the tug Samuel L. Hommden, steamer Halayoark and the steam yacht Cayadetta. The company also has several other contracts in sight.

Haskell & Crawford, Tacoma, Wash., are among the busiest ship builders of the Pacific coast. They have just closed a contract for a steamer for the Alaska trade, launched this week a steamer for the Tacoma-Quartermaster run, and are figuring on a contract for a steamer for service on the upper Columbia river. The vessel just contracted for (names of owners not made public) will be 80 feet over all, 18 feet beam and 8 feet depth of hold. She will have freight and passenger accommodations, electric light plant and modern outfit, and will attain 12½ knots speed. This vessel will ply between several points in Alaska. The vessel launched this week for Wyman & Bibbin of Tacoma, and which will be placed on the Tacoma-Quartermaster Harbor route, will, it is claimed, be one of the finest little steamers on Puget sound. She will be 85 feet over all, 17 feet beam, 6½ feet depth of hold. If the Tacoma firm secures the contract for the Columbia river boat, they will have the material prepared at their Tacoma yard and taken to Northport, where the vessel will be built. So far this year Haskell & Crawford have built the tug Fairfield, barge Shookum and steamer Minneapolis for the Yukon river, and steamer Sentinel for the Tacoma-Seattle mail route.

ORDER BOOKS WELL FILLED.

NO DIMINUTION IN THE AMOUNT OF NEW BUSINESS CROWDING THE SHIP YARDS OF THE ENTIRE COUNTRY—CONTRACTS FOR MACHINERY.

Further confirmation of reports pertaining to the crowded condition of Atlantic coast ship yards is afforded by circumstances connected with the closing of a contract, this week, by Miller, Bull & Knowlton, New York vessel owners, with the Harlan & Hollingsworth Co. of Wilmington, Del., for a steamer for the New York-Porto Rico trade. The New York firm first announced to the Review, a short time ago, their intention of building such a steamer. When it was said that the new boat would necessitate an outlay fully 20 per cent in excess of prices quoted several months ago, something of a surprise was created, and attention was directed to the fact that nearly all of the Atlantic Coast yards now have orders on their books that will keep them busy for more than a year. Miller, Bull & Knowlton were considering the advisability of contracting for a second steamer, of design similar to the one for which they have just placed an order with the Harlan & Hollingsworth Co., but it is now announced that this second order is deferred on account of uncertainty as to delivery and other unfavorable circumstances connected with the rush of work among all the builders of steel vessels. The vessel just contracted for is to carry both passengers and freight and will be 335 feet over all, 40 feet beam and 27 feet depth of hold. The hull will be of steel throughout and the ship will be fitted with triple expansion engines and Scotch boilers, which will enable her to maintain a speed of 14 knots. Accommodations will be provided for sixty first-class and twenty-five second-class passengers, and the contract calls for the completion of the vessel next August. In a letter to the Review Messrs. Miller, Bull & Knowlton, who are also the owners of the Winifred, the first tramp steamer built in this country say: "The new boat will be as fine a vessel as has ever been turned out on this coast, and we will have every modern improvement."

Bidders for supplying machinery and machine tools for the B. Amerton, Wash., naval station were as follows: Fitchburg Machine Works, Fitchburg, Mass.; Niles Tool Works, Hamilton, O.; Gould & Eberhardt, Newark, N. J.; U. Baird Machine Co., 123 Water street, Pittsburg; Joshua Walter Cregan, Philadelphia; Putnam Machine Co., Fitchburg, Mass.; Harrison C. Wyro, 38 Fremont street, San Francisco, informal, no guarantee; Manning, Maxwell & Moore, 111 Liberty street, New York City; Thomas Rickard, 21 Fremont street, San Francisco, Cal.; Brown & Sharpe Mfg. Co., P. O. box 29, Providence, R. I.; McCay Engineering Co., 106 E. German street, Baltimore; Falls River Machinery Co., Cuyahoga Falls, O.; Cleveland Punch & Shear Works Co., 986 Hamilton street, Cleveland, O.; New Jersey Foundry & Machine Co., 26 Cortlandt street, New York City; General Electric Co., Schenectady, N. Y.; J. W. Paxon, Philadelphia; New Haven Mfg. Co., 50 Whitney avenue, New Haven, Conn.; Henry L. Tatum, 34 Fremont street, San Francisco, Cal.; Pacific Tool & Supply Co., 100 First street, San Francisco, Cal.

A number of extensive improvements will be made in the near future at the plant of the Bath Iron Works, Bath, Me. An office building will be erected and all the forges in the works are to be heated with gas, after the English system. A trolley engine will be erected in the plate shop and will operate a trolley which will run at a height of 80 feet from the ground, for the conveyance of plates. The Bath Works has recently taken up another branch of the ship building industry in the manufacture of fishing boats constructed largely of aluminum. The first of these boats, building for Albert A. Root of Buffalo, N. Y., is 14 feet in length, 4 feet 8 inches in width, is made of aluminum 1-16 of an inch in thickness and will weigh when complete less than 200 pounds. The boat has six aluminum ribs, each of which will weigh one pound, in addition to several steel ribs. The boat is constructed in three parts to facilitate transportation and rubber joints will prevent leakage when put together.

The Wm. Cramp Ship & Engine Building Co. of Philadelphia is now employing 5,500 hands, and there is sufficient work contracted for to keep the yard busy for two years. Interests connected with the management give assurance of early action in the matter of a dividend, naming 5 per cent as the probable minimum rate per annum.

Capt. Charles W. Baker, Patchogue, N. Y., has formed a partnership with Rogers, the Bay Shore ship builder, and one of the largest ship building plants on the south side of Long island will be established at once. Marine railways will be an adjunct. It is said that contracts have already been secured for several vessels.

The Jackson & Sharp Co., Wilmington, Del., has secured from the Charles Warner Co. the contract for a barge 110 feet in length, 26 feet beam and 7½ feet depth. The firm also has a contract with the Chesapeake & Ohio Railroad Co. for a car float for service between Newport News and Norfolk, Va.

William E. Woodall & Co., Baltimore, Md., have launched the tug Confidence, building for the Boston Towboat Co., Boston, Mass. The boat is 80 feet long, 20 feet beam and 9 feet deep. The engine, boiler and other machinery were furnished by the Campbell & Zell Co. of Baltimore.

Bids are asked for furnishing for the Norfolk navy yard an electric traveling crane and bridge with a capacity of 40 tons; also a quantity of condenser tubes and lathes and one boring and drilling machine. Edwin Stewart, paymaster general, U. S. N., Washington, D. C.

Work has been started on the 135-foot composite steam yacht Mayita, building by the Gas Engine & Power Co. and Seabury & Co., Consolidated, Morris Heights, New York. The keel has been laid and work on the engine and boiler is under way.

Next week will see four launchings in Bath ship yards. At the Bath Iron Works the yacht building for Col. Payne will slide into the water; at the yards of Kelley, Spear & Co., the New England Co. and William Rogers barges will be launched.

The Gulf Transportation Co. of Crystal River, Fla., has been incorporated by R. J. Knight, J. B. Martin and W. C. Knight, for the purpose of operating vessels on the navigable waters of Florida and the Gulf of Mexico.

C. Jutte & Co., Pittsburg coal operators, are receiving bids for the construction of a towboat. Among the firms bidding are the Elizabeth Marine Ways, Axton & Son of Brownsville, Pa., and Murat Hammet, Pittsburg.

The contract for refitting the steamer Massachusetts for service as a

permanent transport has been let to the John N. Robins Co. of New York at \$98,000. Other bids were given in the Review last week.

The Union Iron Works, San Francisco, has launched the ferryboat Berkeley, building for the Southern Pacific Railroad Co., to run between San Francisco and Oakland.

The Cleveland City Forge & Iron Co., of Cleveland, O., is furnishing the stern frames for the Morgan liners, now under construction by the Newport News Ship Building & Dry Dock Co.

A contract for constructing coal sheds, coal handling machinery, etc. for a coaling station at New London, Conn., has been awarded to J. W. Hoffman & Co. of Philadelphia at \$137,500.

S. F. Hodge & Co. of Detroit have the contract for a \$30,000 engine for the steamer Greyhound. The steamer will also be given new boilers and feathering paddles.

Davison & Griffin, boat builders, Deering, Me., have leased the large building at that place formerly occupied by Lewis, Chase & Whitten and will remodel it for their own use.

The Deetrick & Harvey Machine Co. of Baltimore have been so rushed with orders during the past year that they have decided to build an extensive addition to their plant.

C. F. Brown of North Haven, Me., has secured the contract for a yacht for George S. Silsbee, treasurer of the Atlantic Cotton Mills, Boston. She will be 47 feet over all.

Theo. Crane's Sons, New York city, have launched a three-car float for the Easton & Amboy Railroad Co. A duplicate of the craft is on the stocks.

Quilling & Hanoeh of Enterprise, Kansas, are building a steam launch to be named the Shady Brook and to be used as an excursion boat on the river.

Bids are asked for furnishing machinery for the United States naval station at Port Royal, S. C. Mordecai T. Endicott, Washington, D. C. will receive the bids.

The Ward line steamer Seneca of New York is to be lengthened, giving her more passenger and cargo space, as well as more speed.

Capt. E. Howard, Jeffersonville, Ind., has built, since he assumed the management of the Jeffersonville yard, a total of 606 vessels.

Messrs. Wossidlo & Co. of St. Petersburg, Russia, are seeking quotations on electro-hydraulic riveting machines of various sizes.

The E. J. Codd Co. of Baltimore have about completed the tug E. J. Williams, built for Capt. E. T. Williams of Norfolk, Va.

The E. J. Codd Co. of Baltimore are at work on the revenue cutter Plover. This firm lately completed a tug for E. T. Williams of Norfolk.

GUNBOATS FOR RIVER SERVICE.

Some interest was aroused in ship building circles, a few weeks ago, by the announcement that the firm of Thomas Rees, Sons & Co. of Pittsburg, had secured a contract for a gunboat to be used on the Magdalena river, United States of Colombia, South America, to quell insurrectionists. Although little prominence has been given to the matter, the Pittsburg concern has been building boats of a type similar to the one just contracted for, for twenty years past—has, in fact, shipped more than fifty to Cuba,



RIVER GUNBOAT FOR USE IN SOUTH AMERICA.

Colombia and other countries in Central and South America and the West Indies. The Review herewith presents a picture of the Enrique, built in 1892 for river service in Colombia, and which is in every respect an exact duplicate of the vessel which is now under construction. These boats, which, it will be seen, are similar in design to Ohio and Mississippi river packets, are built of steel, and are 146 feet over all, 24 feet beam and 4 feet depth of hold. They are capable of attaining a speed of 15 miles an hour. All the vessels of this type which have been built are shipped in sections and put together at their destination. The one now under construction will have a swivel gun mounted on the forward deck, protection being afforded by a shield, and in times of war steel rails will be used on the sides to protect riflemen. The crew will number sixty-seven men. The boat will be shipped direct to Barranquilla.

William Rogers, well-known ship builder of Bath, Me., writing to the Review with reference to the dispatch recently sent out to the effect that he and other Bath builders had closed contracts for fifty barges, says that it is absolutely untrue and that orders are on hand in the Maine yards for only a fair amount of wooden tonnage.

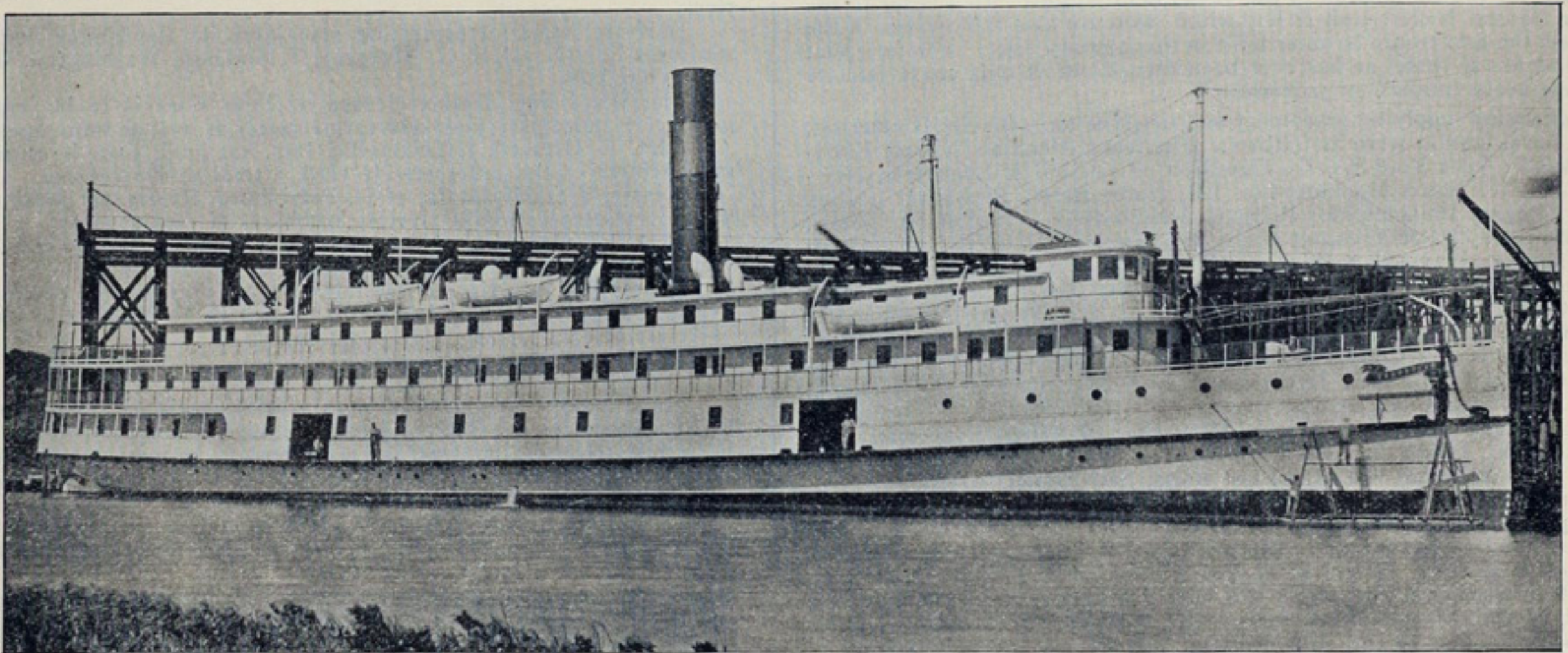
PASSENGER STEAMER TENNESSEE.

ONE OF THE STAUCHEST VESSELS IN THE ATLANTIC COAST SERVICE JUST DELIVERED BY THE HARLAN & HOLLINGSWORTH CO. TO THE BALTIMORE STEAM PACKET CO.

Although the run from Baltimore to Norfolk, the route traversed by steamers of the Baltimore Steam Packet Co., is not a very lengthy one, and is, of course, entirely in inland waters, there are features of navigation on the Chesapeake bay which make it desirable to have vessels of the staunchest character, and this point has seemingly been kept well in view throughout the entire construction of the steamer Tennessee, which has just been turned over to the Baltimore Steam Packet Co.—the Old Bay line—by the Harlan & Hollingsworth Co. of Wilmington, Del., and a picture of which is herewith presented.

The Tennessee is of the following dimensions: Length from inside of stem to inside of stern post, 245 feet; beam, molded, at 10 feet water line, 33 feet 8 inches; beam, molded, at deck, 38 feet; breadth over guards, 43 feet; depth, molded, at side, 15 feet. The hull, which is built in accordance with rules of the United States Standard Register, is of steel throughout, the plates ranging from 7-16 to 1/2 inch in thickness and consequently affording a construction fully 20 per cent. heavier than is customary in vessels of this class. This steamer has a longitudinal bulkhead extending from the water-tight bulkhead aft of the engine room to the water-tight bulkhead at the stern.

Power is furnished by twin-screw, triple-expansion engines of the Harlan & Hollingsworth type and of 2,400 indicated horse power. Cylinders are 18, 28 and 45 inches in diameter by 30 inches stroke. There are



STEAMER TENNESSEE, BUILT BY THE HARLAN & HOLLINGSWORTH CO., WILMINGTON, DEL., FOR THE BALTIMORE STEAM PACKET CO.

four boilers, each 11 feet in diameter by 11 feet 6 inches in length, together with one donkey boiler. The Tennessee is capable of making 19 miles an hour with a full cargo of freight and fuel aboard.

In the forecabin forward on the lower deck are accommodations for the crew, with the second-class passenger accommodations on either side. On this deck also are the freight hold, boiler and engine room, pantry, galley, and accommodations for cooks, waiters, etc. The main deck forward is devoted to baggage and mail rooms, with an elevator for handling freight, while aft is a social hall and a ladies' saloon containing berths, toilet room, etc., all finished in quartered oak. On the promenade deck is the main saloon, from which staterooms, finished in ash, open on all sides, together with toilet rooms, barber shop and other accommodations intended for first-class passengers. On the hurricane deck are located the pilot house and captain's rooms, together with quarters for the principal officers, and also staterooms for additional passengers. The saloon on this deck is finished in maple. In the center of the smoking room also on this deck is a large dome fitted with a skylight, which not only contributes to light and ventilation, but adds materially to the appearance of the vessel. The vessel is equipped with a complete electric light plant and carries two 22-foot life boats and two large rafts. Accommodations are provided for about 300 passengers in all, and the freight capacity is about 2,500 tons. The cost of the ship is given as in the neighborhood of \$250,000. Preliminary plans for this vessel were prepared by John R. Sherwood, general manager of the Baltimore Steam Packet Co. The latter company, of which Mr. R. Curzon Hoffman, also of Baltimore, is president, now has, in addition to the Tennessee, the steamers Alabama and Georgia on the route between Baltimore and Norfolk, with the side-wheel steamer Virginia as a reserve vessel and the Gaston for freight service.

For a comfortable trip to New York take Pennsylvania No. 6, which leaves Union station daily at 1:40 p. m., and from Euclid avenue 1:50 p. m., arriving New York 7:43 next morning. Pullman's very best sleepers run through on this train without change. Supper is served in dining car. Note that the train stops at Euclid avenue station, saving the tedious ride down town to those living in the eastern part of the city. Phone main 1263 or east 513 for space and full information.

The lake steamer John J. Hill, a wooden vessel of Welland canal size built at Marine City, Mich., in 1892, is at Sparrow's Point, Md., this week, loading 925 tons of steel rails for Campbellton, N. B.

WILL THE REMOVAL OF TOLLS HELP CANADA'S SHIPS?

Editor Marine Review:—It appears to have taken some time for the lake interests to find that a valid objection to the throwing off of the Welland Canal tolls really exists. It is a fact that for a time such ports as Buffalo were in doubt as to the propriety of opposing the abolition of the tolls. It seemed to be a mere selfish position to take and might provoke derision, rather than the serious consideration that any expressed desire on the subject should. So the interests of this port concluded to remain silent, and have so far taken no active part in the work of the reciprocity commission beyond expressing, through the Merchants' Exchange, a desire for freer trade. But the better second thought has proven that there is a good reason for even the up-lake vessel owner to doubt whether he has done the best thing in asking for a dropping of the tolls.

What can any vessel owner expect of such a move but a reduction of the freights by the Welland route to correspond exactly with the easement obtained from the Canadian government? There is competition enough to make that a certainty. Everybody knows that the coal rate from Oswego is based directly on that from Buffalo with the tolls added. This The second point is a poser. The lowering of the cost of carrying will will always be the case and it is the same thing with the rates on grain. help the Canadian fleet, which has always asked for it. With the present condition of things the American fleet has steadily overborne that of Canada, till today there is practically no Canadian fleet on the Welland route. We are capturing the trade of Port Arthur, which sent 11,000,000 bushels of wheat to Buffalo in the fall of 1896 and has sent less since that time because it has had less to send. Duluth is now bidding for the handling of this wheat, but it happens that while the Canadian bottom can carry this wheat through the Welland from both these ports, the

American bottom is restricted to Duluth. Here is a distinct loss to us.

There was a time when the owners of vessels that could follow the Welland route and trade with Montreal when the St. Lawrence canals are finished felt that this gave them a chance of earning a profit that the strictly American routes denied him more and more squarely every season. The diversion of so many of these vessels to the coast has relieved this situation somewhat, but this is merely temporary. How long will it be before the fleet on the Montreal route will be overbuilt, just as all others have been lately? It was nothing but the growth of the lake trade so much faster than was expected that prevented this same overbuilding any season since the revelation made in 1882 by the Onoko that the big metal steamer was the real money-maker.

And now that the coast promises to take a matter of 100,000 tons of our more undesirable craft off our hands, how long will it stay there? Just as long as more money can be made there than here. The cat is out of the bag and the abolition of the Welland tolls will tend to keep her out more than anything else that can be done, and all of it to the direct up-building of the Canadian trade and the Canadian fleet to our loss. Of course Canada will also lose a big revenue, but that is not in the consideration.

These changes may have one result that is valuable to us. They will, if all carried out, show us what would happen with a complete deep-water canal to the sea, such as is contemplated; and they will set the vessel-owners fighting such a canal with as much vigor as some of them have advocated it.

Buffalo, Oct. 19, 1898.

JOHN CHAMBERLIN.

Capt. Robert M. Wagstaff, for over fifteen years custodian of the Sand Beach, Mich., harbor of refuge, died at his home in Detroit last week. He had a long period of service in the navy and was mate on one of the vessels of Porter's fleet at the capture of New Orleans and during the siege of Vicksburg.

The death at Lorain of Capt. William H. Wallace of the steamer Vega removes one of the best known masters on the great lakes. He was the son of David Wallace, managing owner of the Lorain Steamship Co., and had been a sailor on the lakes for many years.

Low rate to Chicago and back via the Nickel Plate road, Nov. 10. Special train leaves Cleveland 8:00 a. m. and tickets will also be available on train No. 1 of same day, due to leave Cleveland 7:40 p. m. Round trip \$5.55.

242, Nov. 10.

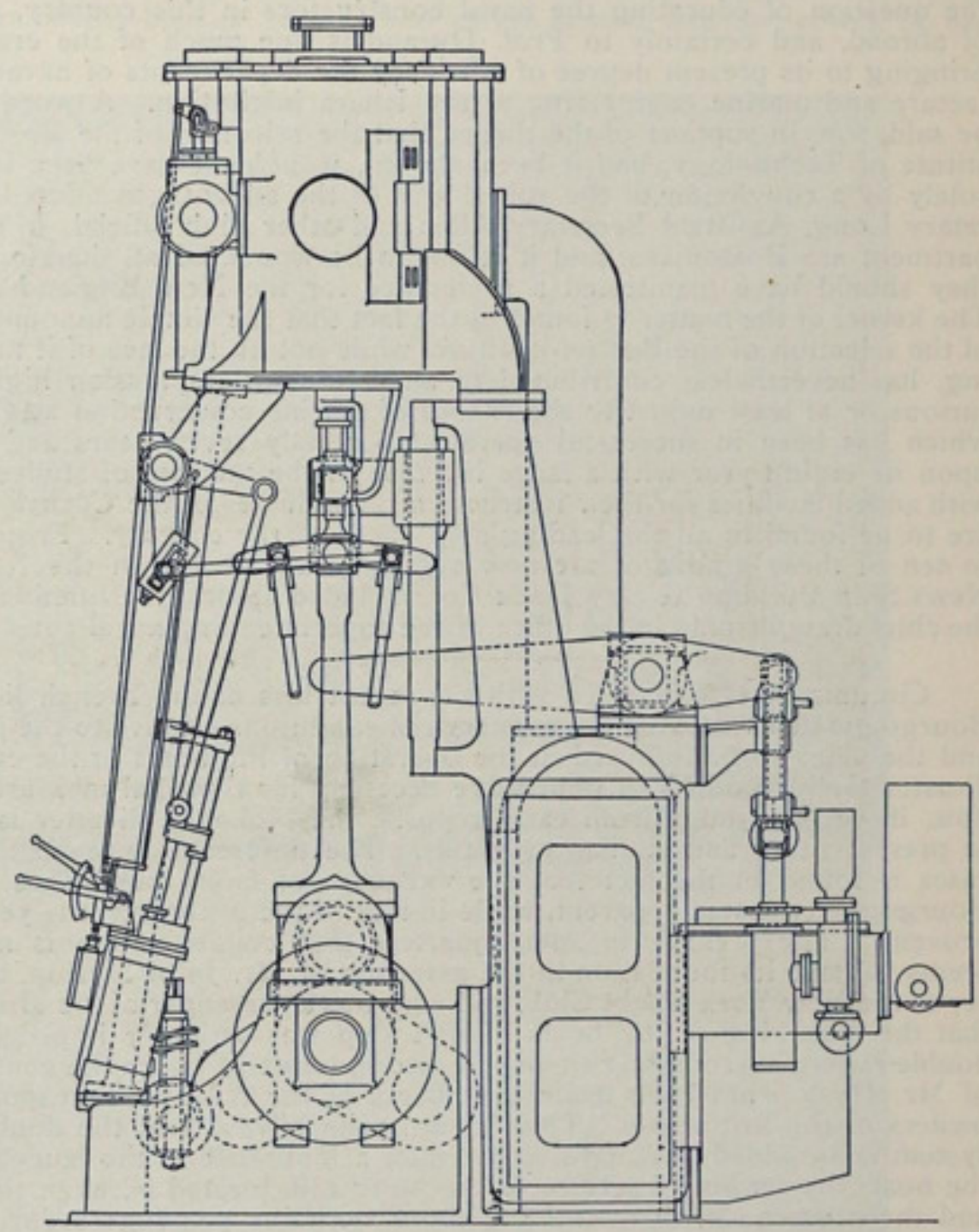
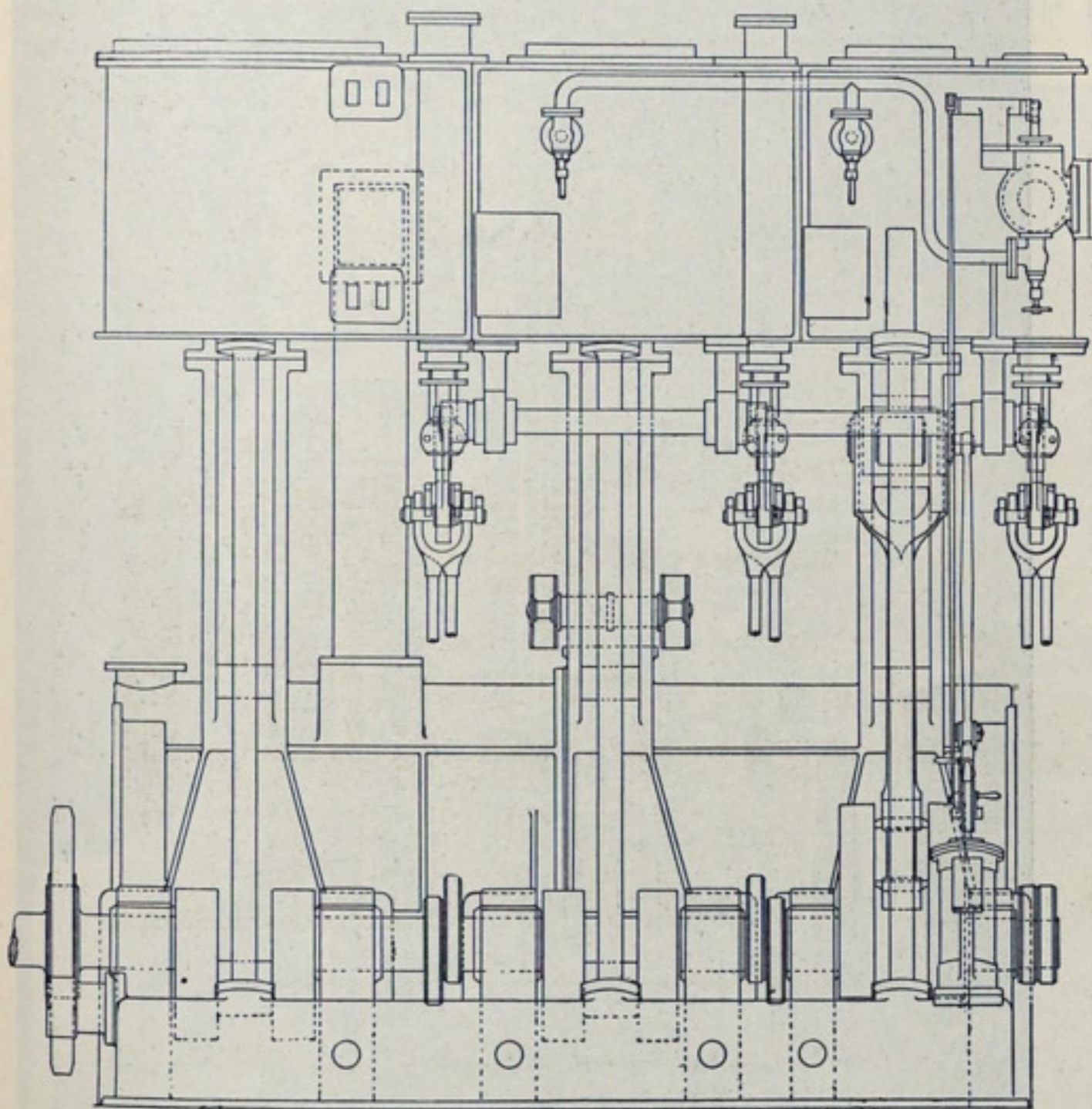
CONTRACT FOR THREE WATER BOATS.

Commodore Bradford, chief of the bureau of equipment, navy department, recently closed contracts with Lewis Nixon to build at his Crescent Ship Yard, Elizabethport, N. J., three water boats, two to have a capacity of 175,000 gallons each, and the other to carry 30,000 gallons. Each of the larger vessels will be 144 feet over all, 22½ feet beam, and will have a draught of 8 feet when loaded. They are to be built entirely of steel, bottom plating and decks. Each will be equipped with a steam pump and boiler, the pump being connected with a very complete system of piping and valves, so that any of the compartments may be filled or emptied at will. There will be five compartments, separated by watertight bulkheads. The entire construction of these vessels is similar to that of oil vessels, and indeed the new vessels will be virtual duplicates, with certain improvements, of two oil boats built for the Standard Oil Co. and used as water boats by the navy department during the recent war. The smaller boat to be constructed at the Nixon yard will be 68 feet in length, 16 feet beam and 8 feet depth and of similar construction to the others. The surprising thing in connection with this contract is that the small boat must be completed in forty-five days and the large ones in seventy-five days. Work was begun Sept. 29. The larger boats have more plating than a torpedo boat, and by nature of the work in which

obtained on 1.5 pounds of fuel. The showing as to fuel consumption on the second trial is even below the 1½-pound mark. Although handicapped by a fresh head wind, the Troy on the way down with this big cargo of flour, made 13½ miles and burned only 1.48 pounds of coal per horse power per hour, including all auxiliaries and with no attempt at jockeying her performance. Officials of the Dry Dock Engine Works, Detroit, are correspondingly happy, as they expected, with the use of Howden draft and everything else in the way of modern appliances in the Troy, to make her the best package freight steamer on the lakes. The Western Transit Co. officials are so well pleased with this vessel that they are, as noted elsewhere, considering the question of adding another steamer to their fleet.

ADVANTAGES OF MECHANICAL DRAFT.

The peculiar advantages of mechanical draft are very clearly displayed in the following quotation from a paper presented by Mr. Alfred Blechyden before the British Institution of Mechanical Engineers and reprinted in the recently issued treatise on mechanical draft published by the B. F. Sturtevant Co., Boston, Mass. Mr. Blechyden says: "First, it seems fairly well established that if the boilers are well constructed and are provided with ample room to insure circulation, their steaming power may



TRIPLE EXPANSION ENGINES OF STEAMER TENNESSEE, BUILT BY THE HARLAN & HOLLINGSWORTH CO., WILMINGTON, DEL.

they will be employed great care must be exercised in their construction. The small boat is already in frame and more than half plated, while work is well under way on the larger boats, notwithstanding the fact that the material has been in the yard but eighteen days.

ACCIDENT TO TORPEDO BOAT DAVIS.

An unfortunate accident occurred last week during the trial of the torpedo boat Davis, built by the Wolff & Zwicker Iron Works, Portland, Ore., but no blame attaches to the builders for any negligence in construction or operation. The boat was disabled by the bursting of a number of boiler tubes, as a result of which eight members of the crew were so badly scalded that seven of them died after the vessel reached port. Excepting for the havoc naturally wrought in the boiler room, the Davis is uninjured. The Davis is fitted with water tube boilers of the English Thornycroft type, and from the meager reports thus far received it would appear that under the strong pressure maintained some of the curved tubes connecting the upper and lower water and steam drums pulled away from one of the drums. An exactly similar accident was sustained by the torpedo boat Mackenzie during her recent trial on the Delaware river. Lieut. Commander Franklin J. Drake, U. S. N., of the trial board, telegraphed the navy department immediately after the accident, stating that the forward boiler had blown up and that the time for repairs was indefinite. Secretary Long, in reply, dissolved the trial board. The accident is greatly regretted at the navy department, for the inspectors had reported that the Davis was well built and likely to fill all requirements.

A HORSE POWER ON LESS THAN 1½ POUNDS COAL.

Quite a stir was made at Duluth and Buffalo, a few days ago, over the big cargo of flour, more than 48,000 barrels, carried down the lakes by the Western Transit Co.'s new steamer Troy. It was the largest load of flour ever taken on by a lake vessel, and probably the largest cargo of its kind ever moved in a ship anywhere in the world, as it would fill 300 of the largest size railroad cars. But there was another feature of this trip of the Troy that was of as much interest to her builders and owners as the size of her cargo. On this trip another test of machinery was made. On the Troy's maiden voyage it was found that a horse power could be

without injury be increased to about 30 to 40 per cent. over that obtained on natural draft for continuous working, and may be about doubled for short runs. Secondly, such augmentation is accompanied in normal cases by an increased consumption per indicated horse power. But, thirdly, the same or even greater power being indicated, it may, with moderate assistance of forced draft, be developed with a smaller expenditure of fuel, the grates, etc., being properly proportioned. Fourthly, forced draft enables an inferior fuel to be used; and, fifthly, under certain conditions of weather, when with normal proportions of boiler it would be impossible to maintain steam with natural draft, the normal power may with forced draft be ensured. In particular cases any or all these advantages may be a source of economy; and the first of them may render possible that which would otherwise be impracticable."

PLENTY OF WORK AT THE ROACH YARD.

Officials of the Roach ship yard at Chester, Pa., state that at no time since 1882 have they had on hand so much work as at present. At the close of 1896 there was hardly a vessel on the stocks, whereas at present the capacity of the yard is tested and inquiries are still coming in. The Standard Oil Co.'s steamer will be launched within a few days, but there is still six months' work upon her, and this is also true of the two steamers building for the Old Dominion Steamship Co. The ferryboat building for the New York service of the Pennsylvania Railroad Co. is almost ready for launching. The keel has been laid for one steam yacht, and the models for two other steam yachts, for which contracts have been secured, are nearing completion in the mould loft. In addition, prospects are excellent for the yard securing the contracts for five transatlantic liners and several coastwise traders.

We are in need of issues of the Review of Jan. 16, 1896, and Sept. 17, 1896, to make complete files, and will pay a liberal price for either or both of these numbers.

Excursion to Chicago, leaving Cleveland 8:00 a. m. and 7:40 p. m., Thursday, Nov. 10, via the Nickel Plate road; \$5.55 for round trip. Five-day limit. 239, Nov. 10.

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

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Discussion attending the recent reports of a transfer of the course in naval architecture from Annapolis to Boston seems to have fostered an impression in some quarters that the Boston institution, which was understood to have been given favorable consideration when the matter was under advisement, is the only one in the country particularly fitted for such an undertaking, or that has given any considerable attention in the past to the subject of naval architecture. Possibly it was not to be expected that this seemingly deep-rooted conviction would be effaced by the announcement that the course is to remain at Annapolis after all. But, if we mistake not, it was Prof. W. F. Durand of Cornell University who, several years ago, was the first to agitate with the secretary of the navy the question of educating the naval constructors in this country, instead of abroad, and certainly to Prof. Durand is due much of the credit for bringing to its present degree of efficiency the departments of naval architecture and marine engineering at the Ithaca institution. A word might be said, too, in support of the theory that the selection of the Boston Institute of Technology, had it been chosen, would not have been induced solely by a conviction of the superiority of the advantages offered. Secretary Long, Assistant Secretary Allen and other high officials of the department are Bostonians, and it is not to be wondered at, therefore, that they should have manifested a preference for the New England school. The kernel of the matter is found in the fact that the simple announcement of the selection of the Boston institute, while not on the face of it misleading, has nevertheless contributed to an erroneous impression highly injurious or at least unjust to the school of marine construction at Cornell, which has been in successful operation for fully seven years and enters upon its eighth year with a large increase in the number of students and with added facilities for their instruction. Graduates of the Cornell school are to be found in all the leading ship yards of the country. From eight to ten of these graduates are now regularly affiliated with the Newport News Ship Building & Dry Dock Co., included among the number being the chief draughtsman in the office of the superintending naval constructor.

Circumstances connected with the recent loss of the French liner *La Bourgogne* demonstrated the existence of conditions relative to the placing and the plans to be followed in the operation of life boats in the event of disaster that embodied an imperative necessity for remedial measures, and now, if we may judge from early reports, the *Mohegan* disaster is likely to present other and similar problems. The difference between the two cases is found in the fact that the existence of faulty conditions in the *Bourgogne* case was apparent, while in that of the *Mohegan* it is yet to be proven. The premise in some quarters that condemnation is merited seems to have its foundation in the assertion of Mr. John Hyslop, an officer of the New York Yacht Club, and who was a passenger of the *Mohegan*, that the launching of the boats of that ship was seriously impeded by a double railing surrounding them. A strong effort to refute the contention of Mr. Hyslop has been made by officers of the Atlantic Transport Co., owners of the lost vessel. Their claim, primarily, is that the double rail system is an added safeguard rather than a hindrance in the launching of the boats, by reason of service of the inner rail, located between the boat and the promenade, in restraining more excitable passengers during the progress of the operation of launching a boat. In short, the allegation is made that the scenes which attended the launching of the boats of the *Bourgogne* illustrate most conclusively what the double rail system is designed to prevent. It will thus be seen that nothing very conclusive has been proven by the arguments thus far presented by either party to the controversy. Mr. Hyslop, it cannot be gainsaid, is to a degree competent for a discussion of the matter (at least his charges cannot be dismissed as would those of a layman), but on the other hand the officials of the Atlantic company have a by no means poor case. There would hardly seem, however, to be warrant for the assertion of one of the officers of the steamship company, that Mr. Hyslop's criticism is totally at variance with the experience and judgment of the best marine architects. Granting to the advocates of this or any other system all the concessions which can consistently be made for the claims presented, it must still be admitted that the life-boat question is an open one and of far too great magnitude and importance to be disposed of hastily.

There would seem, on the surface of the case, to be no question as to the desirability of the acquisition by the United States government of the floating dry dock constructed for the Spanish government and now located at Havana. Several means for accomplishing this purpose are open to utilization, with an indication that the employment of even the most expensive of them would still be entirely justifiable from the standpoint of the benefit to be derived. Press dispatches from Paris intimate that the American members of the peace commission are endeavoring to insist upon the surrender of the dock to the United States government on the plea that the principle on which the Spanish naval vessels in conquered territory were allowed to depart is in no degree applicable in the present case. This would seem, in all candor, a rather presumptuous proposition, and it would hardly seem wise to place too much dependency upon it as a means of accomplishing the purpose desired. At the same time, the dock should be secured, and if the reports to the effect that the harbor authorities of Kingston, Jamaica, are negotiating for it, as little delay as possible on the part of the United States government would seem advisable. From a business standpoint the shrewdest possible move would seem to be to acquire from the builders of the dock the lien which it is understood they still hold upon it. The dock was built at Newcastle-on-Tyne at a cost of \$4,000,000, has actually lifted an 8,900-ton ship, and can raise a 10,000-ton vessel. This would enable the docking of any of the United States war vessels except

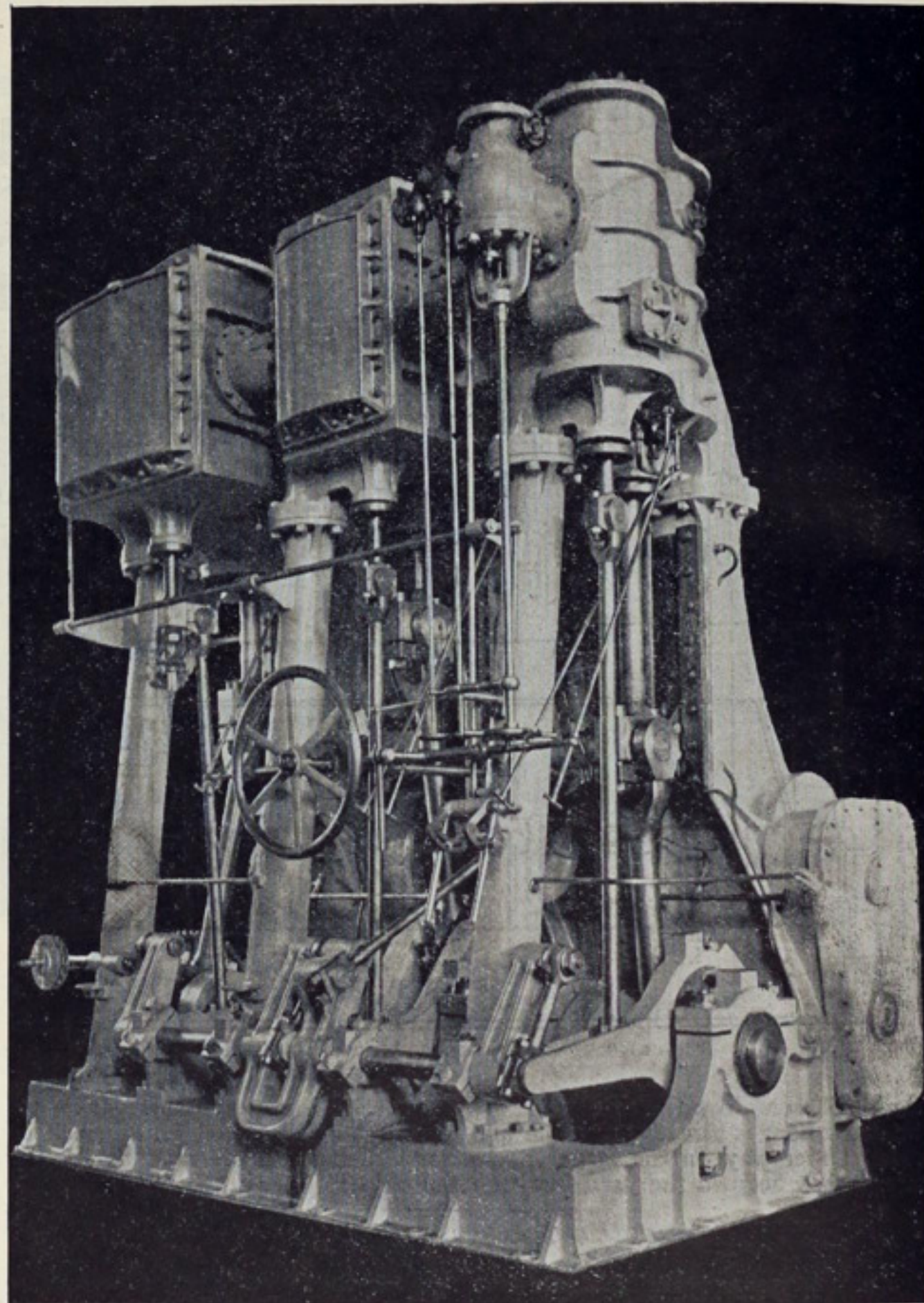
the largest battleships, and if the present rather meager dry dock facilities of this government are taken into consideration, its value can hardly fail of appreciation.

STAUNCH NORWEGIAN STEAMER.

THE BELVERNON, RECENTLY COMPLETED BY THE BERGENS MEKANISKE VÆRKSTED, OF BERGEN, NORWAY, FOR THE UNITED STATES FRUIT TRADE.

Through the courtesy of Mr. Carl L. Holmer, naval architect, connected with the Bergens Mekaniske Vaerksted, Bergen, Norway—one of the leading ship building concerns in the Scandinavian peninsula—the Review is enabled to present pictures of the steamer *Belvernon*, recently completed at that yard, and her engines. The *Belvernon*, which is designed for the fruit trade, chiefly with Atlantic coast in the United States, is one of the most important vessels built in Norway in some time, and typifies that staunch construction supposed to be characteristic of the Norse builders.

The *Belvernon* is 236 feet 9 inches over all, 227 feet 3 inches between perpendiculars, 31 feet 6 inches beam, molded, and 15 feet 8 inches depth.



TRIPLE EXPANSION ENGINE OF NEW STEAMER BELVERNON.

Engines are of the inverted, triple-expansion, three-crank type, with cylinders 18½, 30 and 50 inches in diameter by 33-inch stroke. There are round cast-iron columns in front, and condenser and columns receiving the guide faces at the back. Valve gear is of the Marshall type, with the valves lying to the front of the engine, giving a very compact arrangement of the cylinders fore-and-aft, and at the same time having the advantage of a smaller number of working parts of valve gear than any other gear in existence, presupposing the valve gear to be of the reversible type. The crank shaft is of the built-up type and made in two parts. The air, feed, circulating and bilge pumps are all worked off the low pressure crosshead by means of levers and links in the usual way. Steam reversing gear of the all-around type is provided. Steam is supplied from two steel boilers, each 12 feet 6 inches in diameter by 10 feet 3 inches in length, with a steam pressure of 175 pounds. The grate surface aggregates 85 and the heating surface 2,920 square feet. Under natural draft there is possible a development of about 900 indicated horse power.

The plant of the James Clark Co., Baltimore, under the management of Mr. W. L. Cahill, is undergoing extensive alterations. The old buildings are being torn down and new ones erected. A large and very complete machine shop is already enclosed and a few of the tools placed. Among the new tools are a large Deetrick & Harvey planer; a 48-inch lathe, 24 feet in length, from Putnam & Co.; Stillwell-Buice pump; Buffalo blower, and a Frick-Corliss engine. They are also building a 36-inch lathe. A new boiler shop, about 60 by 100 feet, will be erected during the winter.

COMMODORE MELVILLE'S VIEWS.

THE ENGINEER-IN-CHIEF OF THE UNITED STATES NAVY DISCUSSES IN HIS ANNUAL REPORT THE LESSONS OF THE WAR WITH REFERENCE TO MACHINERY OF OUR SHIPS.

Engineer-in-Chief George W. Melville of the bureau of steam engineering, the navy department, devotes a considerable portion of his annual report to a summing up of the more important lessons of the naval engagements of the Spanish-American war in so far as the lessons in question have a bearing on the machinery of the warships. He states that the late war is the first in which modern steam vessels have had a thorough trial and his conclusions, which amount to recommendations, are deduced as follows:

"1. The vital necessity of giving the machinery of vessels in reserve frequent tests under working conditions, so that any defects may be discovered and remedied before war makes the vessels' services absolutely necessary. In several cases defects were found after the ships had begun cruising, and the repairs laid them up in the midst of the war.

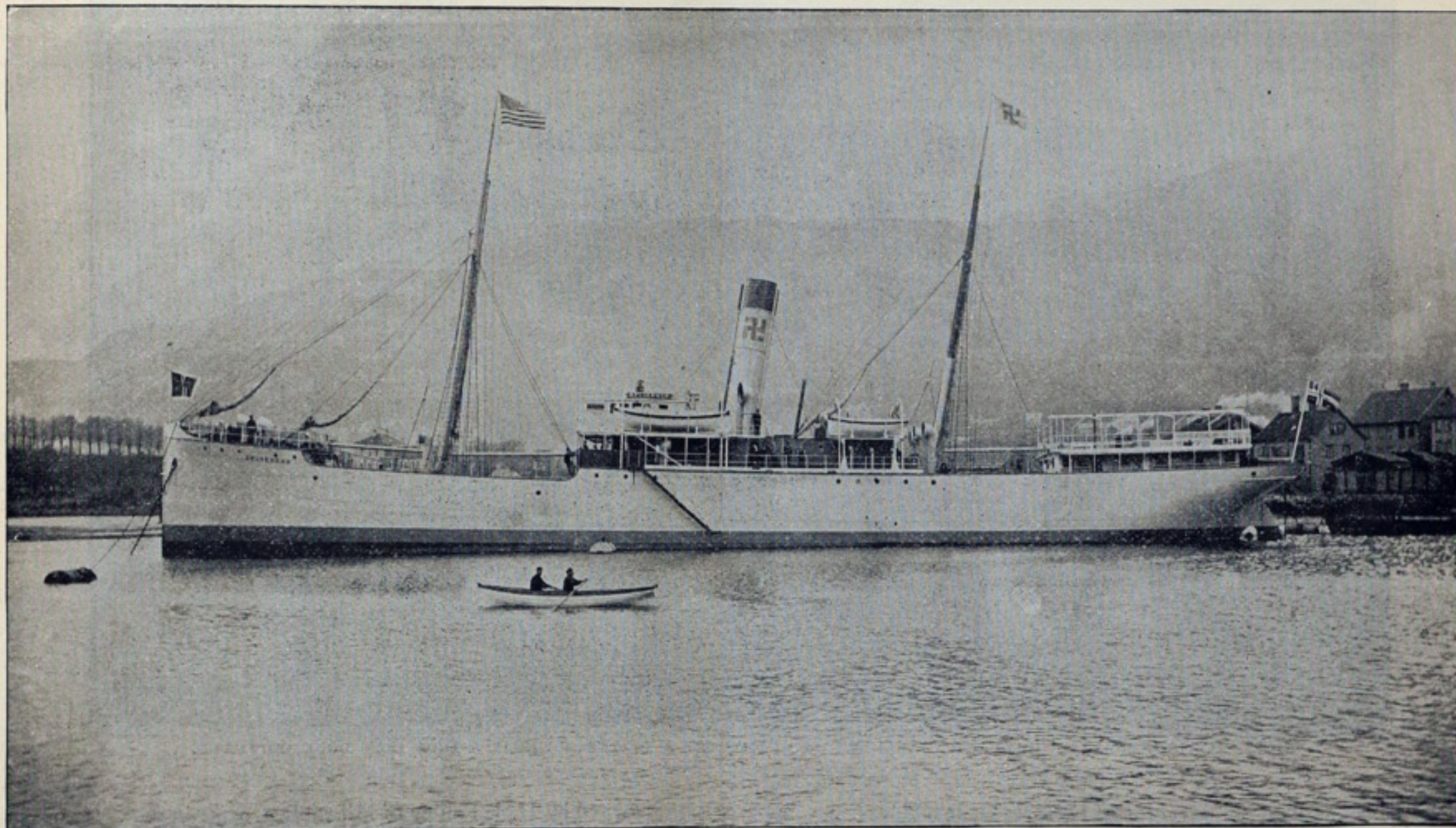
"2. The great importance of having all our naval stations in positions of strategic value properly fitted out for repairs and with adequate supplies of non-perishable stores. It had been evident for a long time that Key West was such a station, but money to put in a proper repair plant was refused year after year, and only granted after the war had begun. The

active list to sea we were able to give the regular ships a fair complement of trained ones, but had the war been of long duration we should have been greatly embarrassed to supply the places of those disabled or invalidated. Volunteers, however, well trained in other ways, cannot entirely replace the regular officer.

"10. That we must make provision for training the enlisted men of the engineer department. Many of the colliers and auxiliary vessels had to start out with absolutely green crews, many of whom, so far from having the 'sea habit,' had never been on a vessel of any kind. This must be remedied if our enlarged fleet is to be efficient.

"11. That our fighting ships must have the highest practicable speed. There is an almost general agreement on this point among naval men, but if any had thought that this did not apply to battleships the fight at Santiago must have shown that the highest practicable speed is just as important in these vessels. It is very gratifying, therefore, that our three new battleships are to have speeds of at least 18 knots, which is now recognized as the standard."

In discussing the showing made by the machinery of the naval vessels in service during the war occurs the following: "It is greatly to be regretted that the torpedo boats cannot show the same excellent records for their machinery, but it is a sad fact that nearly every one has had some accidents, and the machinery of some at the close of the war was in a condition which can only be described as horrible, where boilers were burnt, cylinder covers broken, pistons and valves struck, and everything in bad



STEAMER BELVERNON, BUILT BY THE BERGENS MEKANISKE VAERKSTED, BERGEN, NORWAY.

movement of large bodies of troops and their equipment almost blocked the railroads, so that after the beginning of the war it was almost impossible to secure the forwarding of tools and supplies.

"3. That fresh water for the boilers is almost as important as coal, and that a distilling ship is an important adjunct of a fleet operating away from a base where fresh water can be readily obtained.

"4. That every fleet needs a repair ship to enable the efficiency to be maintained without leaving the station, and consequently that several ships should be equipped so as to be ready to proceed with the fleet.

"5. The great tactical advantages of water tube boilers.

"6. That if more than two main engines are to be fitted, there should be three engines driving three screws, and not two main engines, on each shaft. The New York and Brooklyn had their forward engines disconnected at the time of the Santiago fight and could not stop to couple them. An accident to any part of either of the two engines on a shaft disables half the power; in the three-screw ship this fraction would be only a third.

"7. That there should be frequent trials under forced draft to keep the blowers in good condition and to make the men thoroughly familiar with working under maximum conditions. It appears that some of the ships had never been under forced draft since their contract trials until the day of the fight at Santiago.

"8. That the location of the forced-draft blowers is a matter of serious importance. In some of our ships, owing to the demands for all other space for other purposes, the blowers had to be located in corners or pockets in the fire rooms, where it was impossible for human beings to give them proper attention, owing to the intense heat due to lack of ventilation. In the Cincinnati temperatures as high as 205 degrees Fahrenheit were noted, and the commanding officer, when investigating the case personally, had his face scorched. The blowers must be placed where they can be properly cared for, or else they are useless, and might as well be left on shore.

"9. That the personnel of the service should be adequate to the material. It has been notorious for some time that this is not the case, and we are providing for a decided increase in the number of vessels with no increase whatever in the personnel. By sending nearly every officer on the

shape. This condition of affairs seems attributable to two causes, the absence of trained engineering supervision and the use of the boats for duty to which they were not adapted."

The report urges the importance of building our machinery in classes with identical machinery for the vessels of each class, and regrets that the result of inviting alternate bids is to introduce several varieties of machinery even in torpedo boats and destroyers where uniformity is especially necessary. Says the engineer-in-chief: "The theory on which the alternative bids are invited is that all the skill in the designing of hulls and machinery is not confined to the bureaus of the department, which, of course, is true; but it is just as true that the designers of the department, who confine themselves to this class of work, ought to be and are better able to decide what will best answer the needs of the service. * * * If bidders submit plans containing features superior to any in those of the department it would be foolish not to adopt them, but, in my judgment, the adoption should consist of a modification of the department plans to that extent, so that all builders would have to follow them."

Since 1895, German ship builders have delivered twenty-four war vessels for other maritime powers, as follows: China, three armored cruisers, five torpedo boat destroyers and six torpedo boats; Brazil, two torpedo boat destroyers; Turkey, one torpedo boat destroyer; Austria, one torpedo boat and one torpedo boat destroyer; Norway, three torpedo boats and one torpedo boat destroyer; Sweden, one torpedo boat. At present there are orders to be filled for twenty-two vessels, divided in this manner: Brazil, one torpedo boat destroyer; Japan, eight torpedo boats, one torpedo boat destroyer and one armored cruiser; Italy, four torpedo boat destroyers; Russia, four torpedo boat destroyers and three large cruisers. The value of the armored cruiser ordered by Japan is given at \$3,094,000, and that of the three large cruisers ordered by Russia at \$5,712,000.

The United States cruisers Chicago, Atlanta and Yorktown, which have been undergoing repairs, are ready to go into commission, but will be delayed on account of a lack of men to man them.

NEW COAL UNLOADING MACHINE.

THE HULETT INVENTION INSTALLED ON THE DOCKS OF THE ROCHESTER & PITTSBURGH COAL & IRON CO. AT BUFFALO BY THE WEBSTER, CAMP & LANE CO.

The problem of speedy and economical handling of cargoes is so vital in the freight traffic of the great lakes, and so great are the achievements already made in this direction, that considerable interest will naturally attach to the advent of another new type of unloading machine designed to present another solution of the problem of the transfer of coal from cars to vessels. The coal unloader recently completed by the Webster, Camp & Lane Machine Co. of Akron, O., for the Rochester & Pittsburgh Coal & Iron Co. on their Ganson street docks at Buffalo, embodies many radical alterations from other unloaders designed and pat-

required to operate this machine—one fireman or engineer and three lever men. As two hatches are filled at one time, the boat is only moved half as many times as is the case where a single chute is used. The buckets also act as trimmers, distributing the coal well across the boat, and delivering the coal so evenly and gradually that the breakage is reduced to a minimum. The average speed of loading with this machine is said to be about the same as that of other car dumpers in use, depending largely on the class of boats loaded and the amount of trimming required.

STRONG MEASURES NECESSARY AT BUFFALO.

Buffalo, Oct. 25.—There is a fight on here which the lake interests will surely be anxious to hear about. The question is the old vexed one of demurrage, still unsettled, in spite of the late decision of Judge Cox against the vessel. Some days ago the steamer Walter Vail and consort

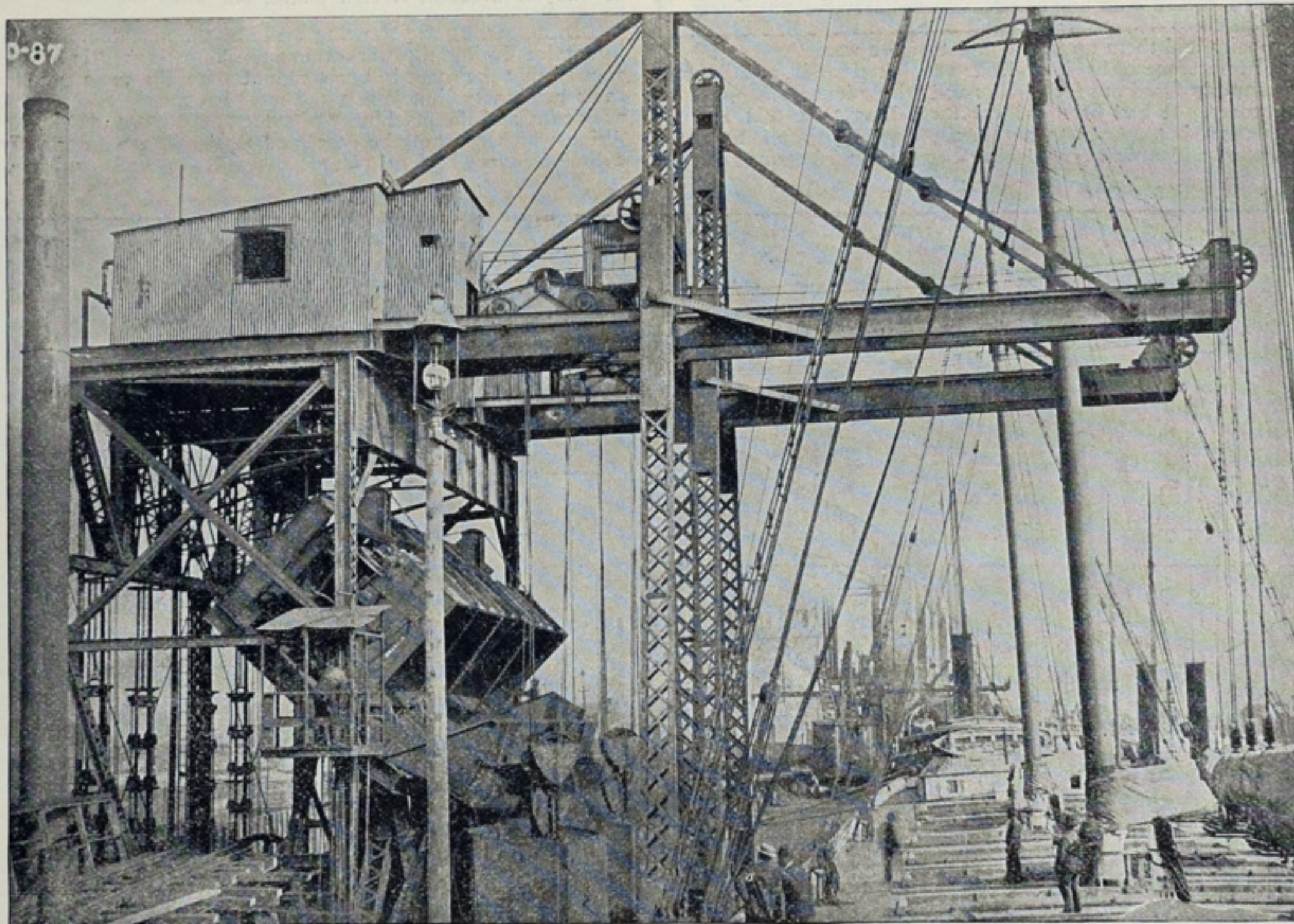


FIG. 1. COAL UNLOADING MACHINE INSTALLED ON ROCHESTER & PITTSBURGH COAL & IRON CO.'S DOCK, BUFFALO.

ented by Mr. G. H. Hulett, the inventor of the present machine.

This machine was designed especially with a view to transferring coal from cars to boat with the least possible breakage obtainable, with rapid handling and without an increase in the number of men necessary to operate it. In this machine the loaded coal car is drawn up in the cradle, or platform, by a disappearing car or dilly. In the accompanying illustrations, figure 2 shows the cradle in its normal position, with the car in place thereon. The cradle is then turned upon a pivot until the car is inverted to the proper angle, about as shown in illustration figure 1. As the cradle is revolved, the car, which is mounted on a movable track, moves over against the side of the cradle and rests securely against the same. When the car is inverted it requires no side clamps to hold it in place. It is prevented from tipping off the cradle by chains, clearly shown in the illustration, passing over the top of the car. To the free ends of these chains counterweights are attached of sufficient weight to hold the car against the cradle, the counterweights being clearly shown in the illustration figure 1, at the left side of the illustration. The clamping is thus entirely automatic and is all that is required. As the car is being inverted, the coal slides out of the car into a hood, shown also in figure 1. There is no drop from the car to this hood. After the car is inverted, doors in the end of this hood are opened and coal flows into the two buckets shown in the illustration, in this case the buckets being of 22 tons capacity each. The lower ends of these buckets for a distance of 12 feet from the bottom are 5 feet 6 inches by 8 feet in size, so they can be lowered for 12 feet through the hatches of small boats, and will go to the bottom of large boats having hatches more than 15 feet long. The bottoms of these buckets are drawn up through the shell of the buckets, and as the coal flows into them from the car, the bottom is lowered while the bucket fills, with very little, if any, drop from the car to buckets.

Two conveyors are provided—one for each bucket—and while the empty car is being unloaded and run off and another car run on, the buckets are hoisted, run out over the boat (as shown in illustration figure 2) and lowered through the hatch, until close to the bottom, when, by holding the shell with one drum and lowering the bottom of the bucket with the other, the coal flows out of the bottom of the bucket. The conveyors are hinged just outside of the mast, so they can be raised when moving the vessel, and the entire conveyor, being pivoted at the rear end of the structure, is arranged to swing so as to adjust conveyors to hatches of different centers. There being two buckets and two conveyors, no time is lost or men required in hooking or unhooking buckets. Four men are

Baltic, owned by H. J. Pauley of Milwaukee, came in with cargoes of grain. There was no room at the elevator for them and they waited two or three days before they could unload. The owner has attached the cargoes for damages. This will, of course, be a long fight, and the present season will not reap the benefit of it, if it turns out that the vessels come out best. This is, or ought to be, the signal for all vessel owners to fall into line and make a fight for their rights. The matter cannot, of course, be settled while the rush is on during the balance of the season, but with big interests like the Rockefeller vessels and other ore fleets entering the grain trade, it would seem that plans could be laid so as to dispose of this trouble before another season comes around. It is morally certain that if owners show a solid front something can be done. Judge Cox's decision maintained that all elevators in the harbor at Buffalo were full at the time the City elevator was sued in 1891, but such is not the case now. Only the City and the Coatsworth are now holding vessels back.

In this connection mention should be made of the position taken by A. B. Wolvin of the Zenith Transportation Co., Duluth. In letters to his agents here, he declares that it is high time something is done. Though it is a fact that his big steamers have suffered much less than the average, he is awake to the possibilities and asserts that it would be an easy matter to obtain a satisfactory demurrage clause in bills of lading from shippers, just as the flax-seed clause relieving the vessel of certain liability was obtained. Mr. Wolvin also cites another abuse, which in this case is chargeable to his end of the route. He says a vessel is chartered in the morning and begins to go about from elevator to elevator picking up her cargo. She goes perhaps to three houses to load and four or five to unload when she gets to Buffalo. At noon another vessel makes the same peddling trip, and in the afternoon a third follows. He insists that it is, in practically all cases, just as well for the shipper if the three vessels loaded and unloaded at one elevator, each taking a different one. The grain would be moved to the shipper's satisfaction and the cost to the vessel would be much reduced. The question is whether the vessel interests will get together this winter and put through a bill of lading that will correct these abuses. At this writing (Tuesday night) the New York Central elevator is about two days behind its cargo and the Coatsworth about four.

There will be no mobilization of the North Atlantic fleet at Hampton Roads this autumn, as has been customary in former years, owing principally to the fact that the eastern navy yards are overrun with work and it would be impracticable to assemble the vessels for at least six weeks.

A FEW POINTS ABOUT GAS BUOYS.

An article in the London Times of recent date describes, with the usual accurateness of that great publication, the Pintsch gas buoy, which was unheard of on this side of the Atlantic up to a few years ago, but which is now known as a valuable aid to navigation, lighting channels everywhere throughout the country, and especially on the lakes.

"The Elder Brethren of the Trinity House have done much to encourage the development of the system in England," says the Times, "by placing gas-lighted buoys at many important points in the channels at the entrances of the Thames, in the Solent and elsewhere. This example has been quickly followed by the Scottish light-house board, the local authorities for the Mersey, the Clyde, the Tees, the Ribble, King's Lynn and sundry other seaports, and now on the coasts of the United Kingdom there are close upon 100 gas-lighted buoys in position. In the Suez canal, and in Canadian and Australian waters, these buoys are also in use. In France the lighting of buoys by means of gas has been largely adopted

ment in our coast-marking arrangements that has taken place in the last five and twenty years. It may be that in time the majority of buoys will be gas-lighted. The door is now open for such an advance, and if it should ever come to pass it will be of immense benefit to our maritime traffic."

A question often asked is, Why cannot coal gas be used in these buoys? The answer is conclusive. Compression robs coal gas of half of its illuminating power. It is necessary, of course, to compress the gas for buoy purposes. In oil gas the loss due to compression is so slight that it is practically immaterial. Julius Pintsch of Germany, the pioneer of this system of buoy lighting, seems to attach considerable secrecy to the method of making these buoys. The buoy must be very strongly made to enable it to withstand the internal pressure of the compressed gas—equivalent to that of about five atmospheres—and it must also possess the quality of being gas-tight, by no means an easy thing to accomplish when the buoy is made of riveted plates, but when the buoys are welded this

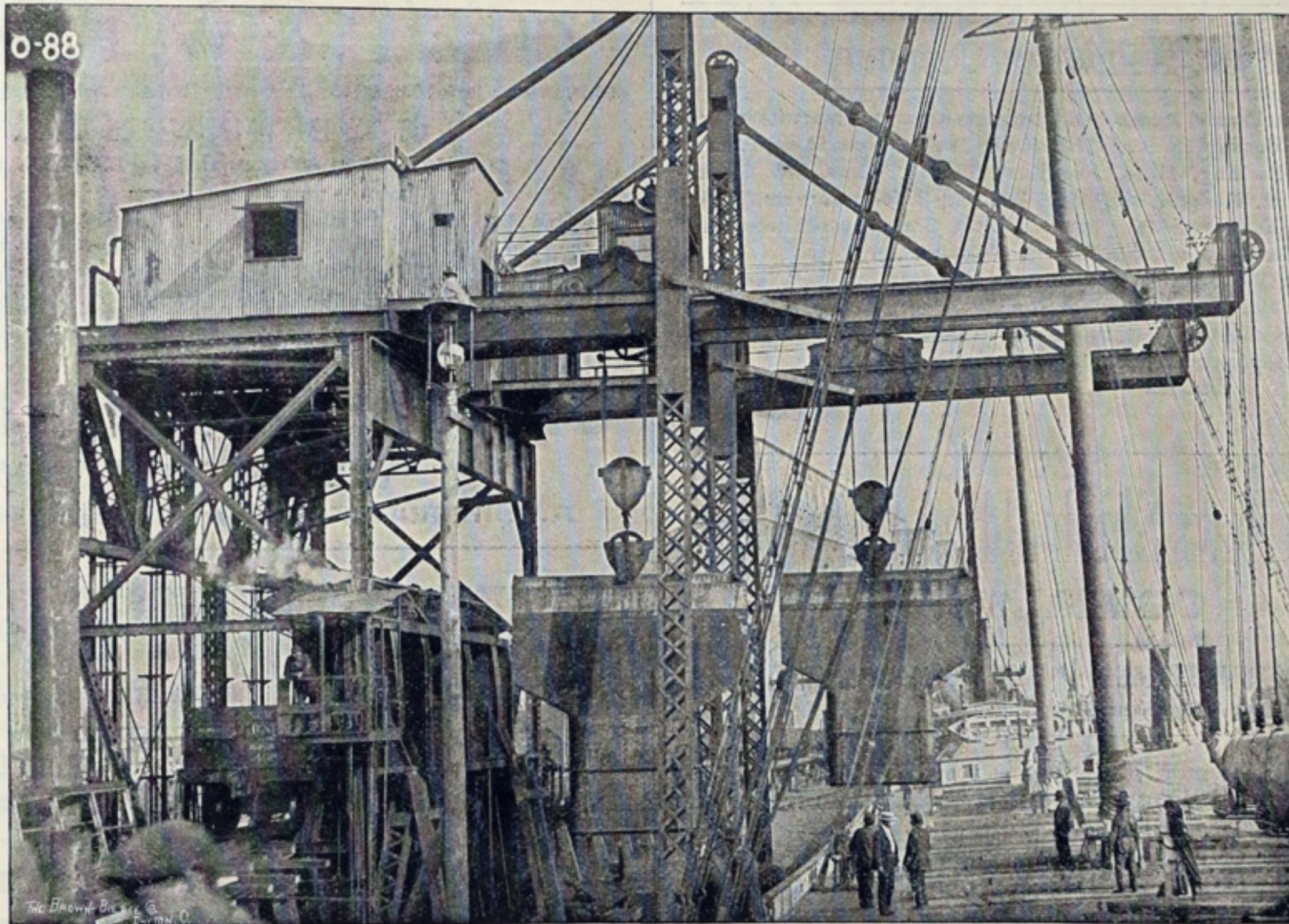


FIG. 2. COAL UNLOADER, MANUFACTURED BY THE WEBSTER, CAMP & LANE MACHINE CO., AKRON, OHIO.

of late years, the light-house authorities of that country having taken up the matter with their usual vigor and placed such buoys in many parts of their coasts. In Germany, Denmark, Russia, Holland and Italy numerous gas-lighted buoys have replaced unlighted ones, and, in fact, the system is coming into use in all parts of the world.

"It is almost impossible to convey to the minds of landsmen the sense of relief experienced by an anxious mariner approaching narrow waters at night when he sights one of these gas-lighted buoys about a mile ahead, giving him explicit information as to his position, and it may truly be said that the development of this system is the most important improve-

ment in our coast-marking arrangements that has taken place in the last five and twenty years. It may be that in time the majority of buoys will be gas-lighted. The door is now open for such an advance, and if it should ever come to pass it will be of immense benefit to our maritime traffic."

Chicago excursion via the Nickel Plate road leaves Cleveland 8:00 a. m. and 7:40 p. m., Thursday, Nov. 10; \$5.55 for round trip. Tickets good five days. 240, Nov. 10.

NOTICE.—The Pro. Tug HELENE, owned by John W. Averill, Jr., burden about 12.50 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M., to satisfy an indebtedness of \$7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Vol. 17, page 71, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio.

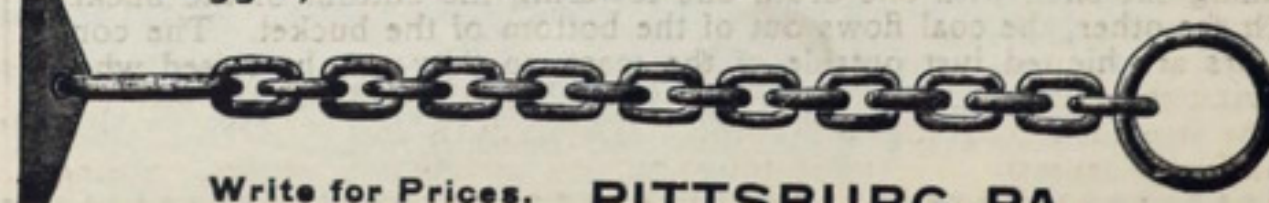
NOTICE.—The steel steam fish pile driver "IDEAL", owned by John W. Averill, Jr., burden about 13.18 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M., to satisfy an indebtedness of \$7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Vol. 17, page 71, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio.

NOTICE.—The steam pile driver "FISHING QUEEN", owned by John W. Averill, Jr., burden about 7.91 tons, together with boilers, machinery, anchors, cables, furniture, tackle, and all appurtenances, will be sold from the west steps of the Post Office Building, Cleveland, Ohio, on Tuesday, November 29, 1898, at 10 o'clock, A. M., to satisfy an indebtedness of \$7,700.00 of the National Bank of Commerce of Cleveland, Ohio, against said John W. Averill, Jr., under a certain mortgage, recorded Book 71, page 72, Office of Collector, Cleveland, Ohio. SQUIRE, SANDERS & DEMPSEY, Attorneys for National Bank of Commerce of Cleveland, Ohio.

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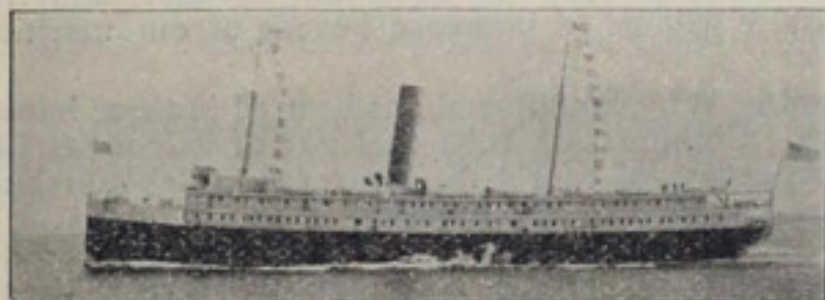
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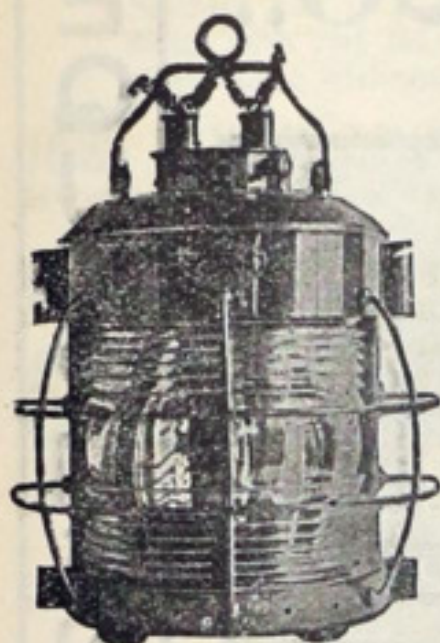
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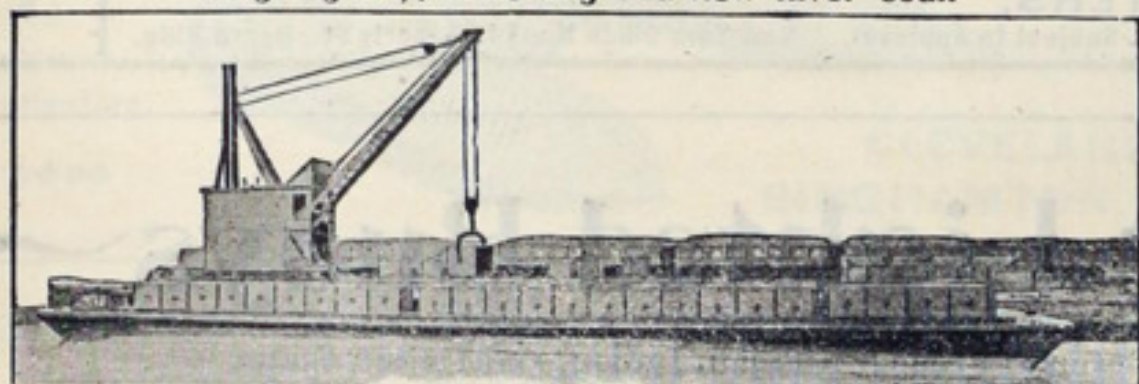


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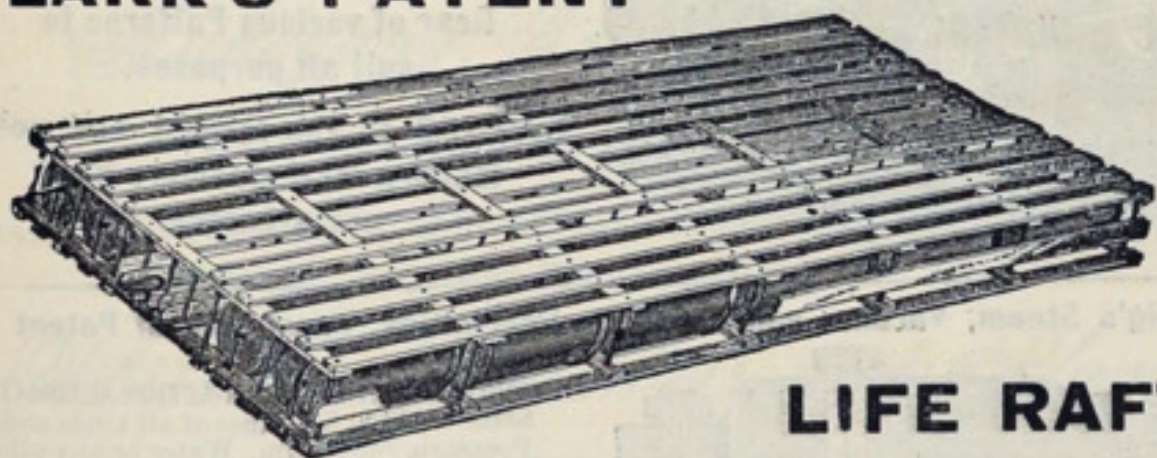
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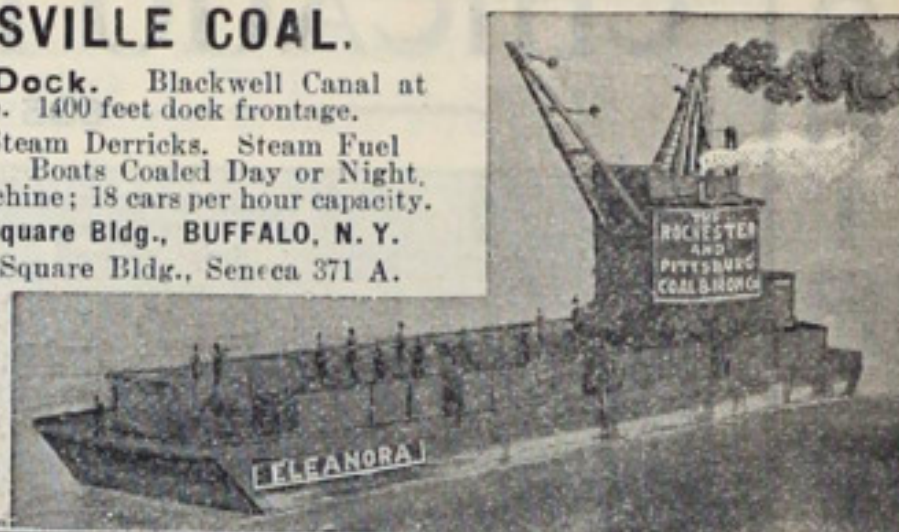
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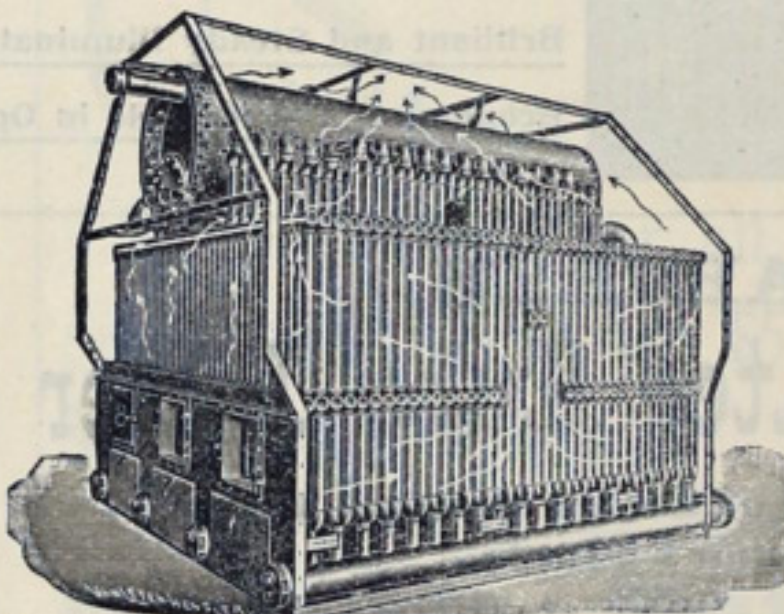
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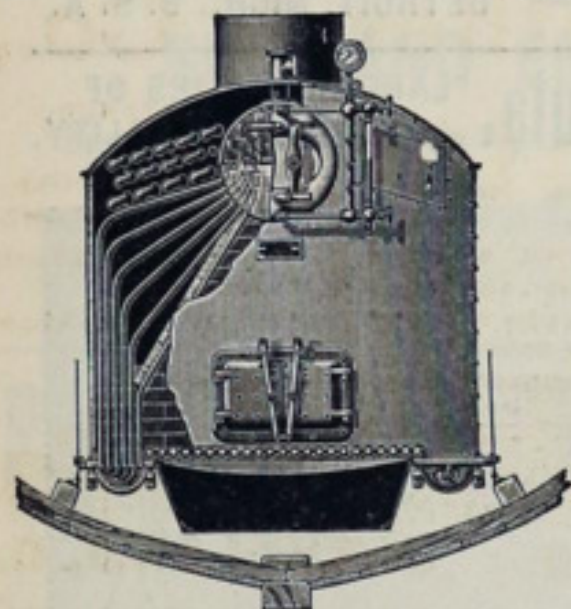
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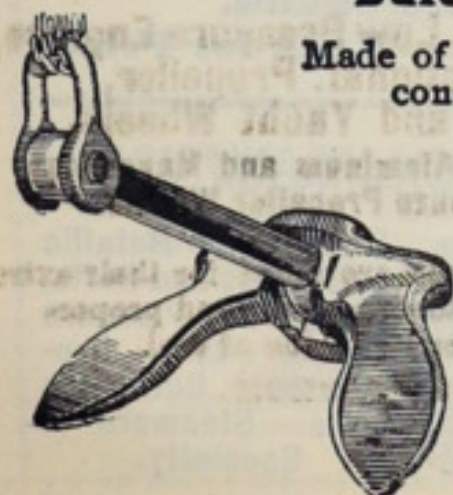
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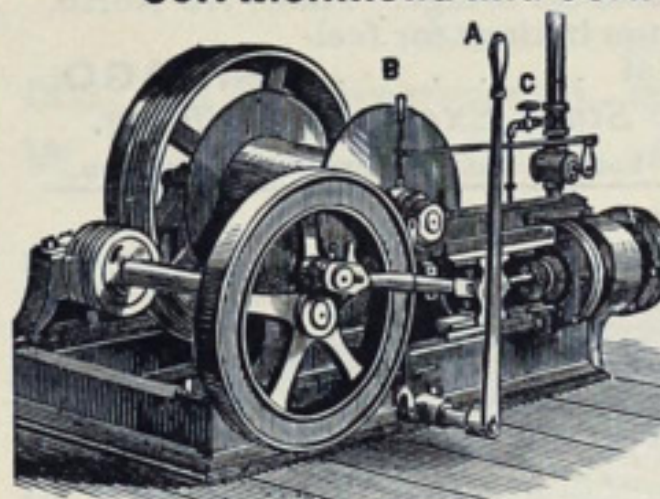
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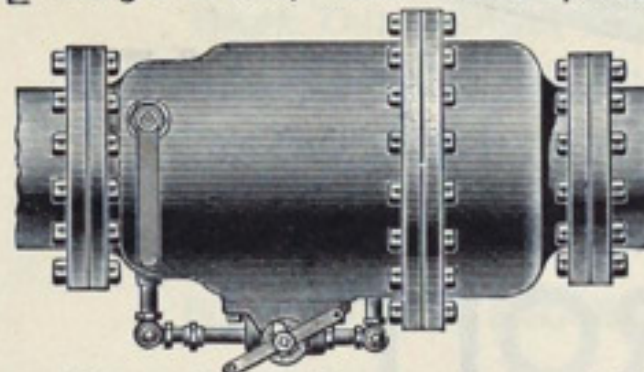


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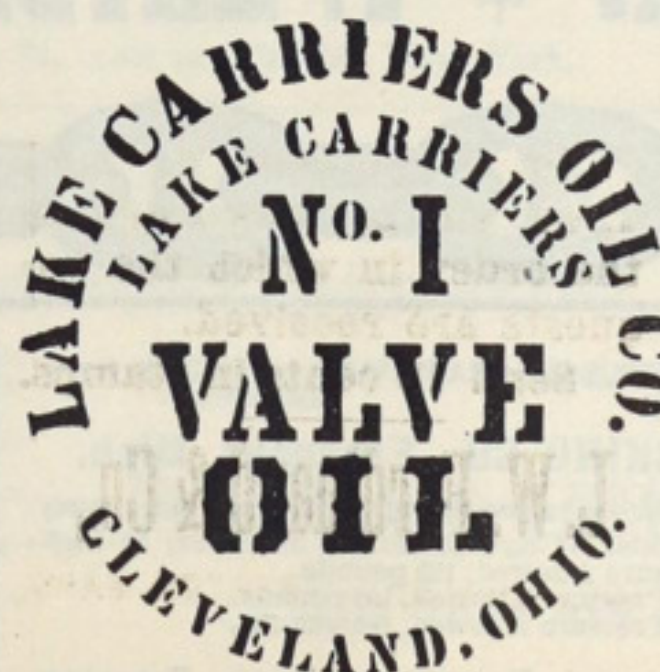
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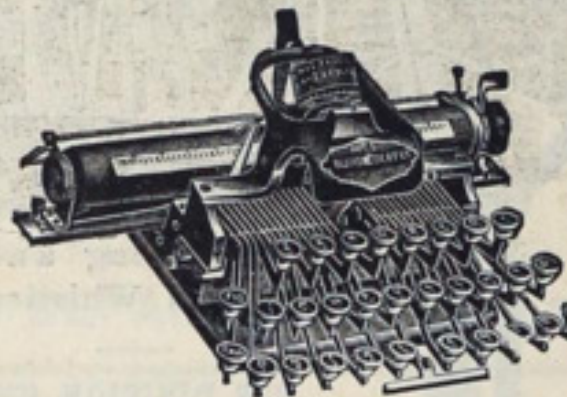
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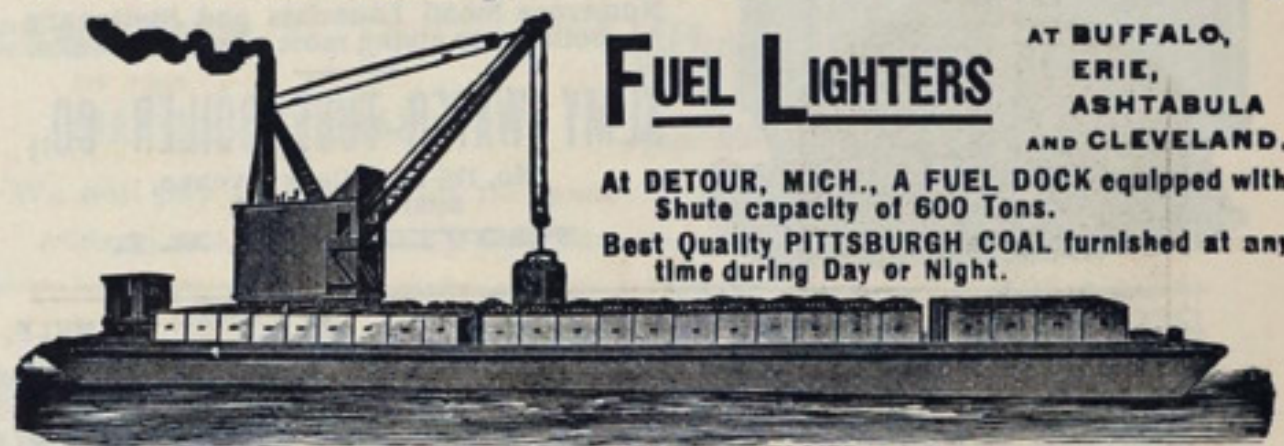
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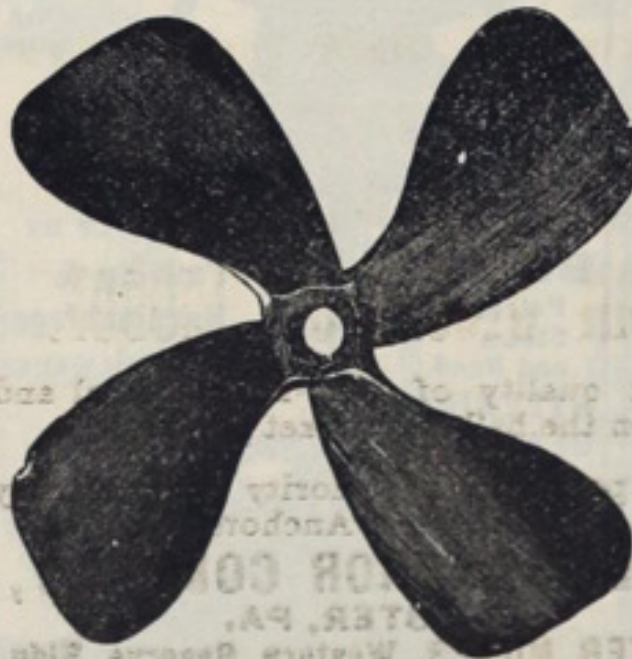
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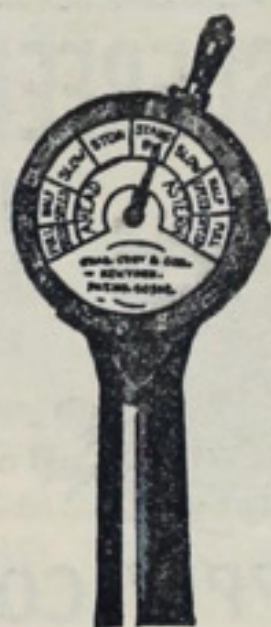
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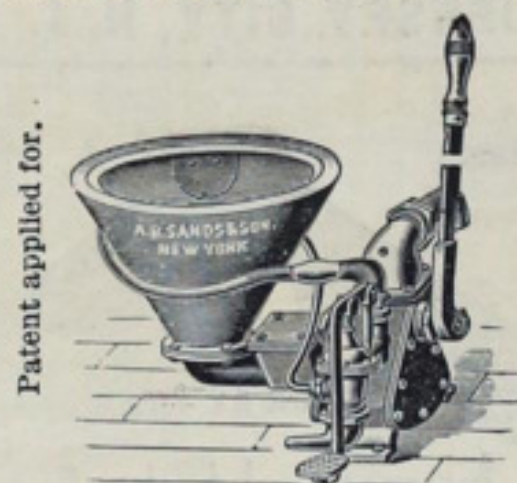
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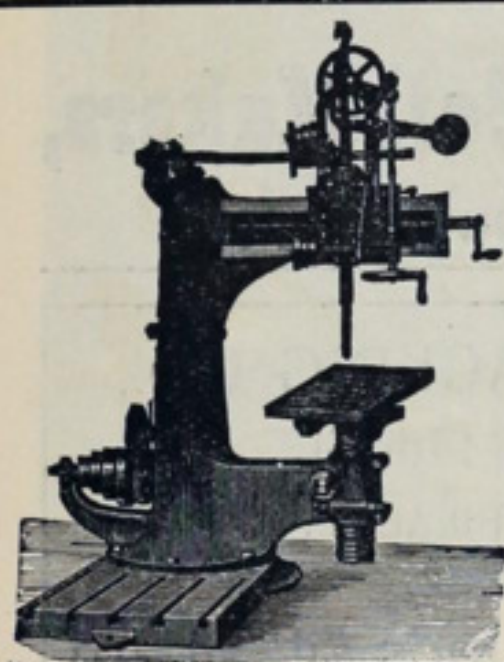
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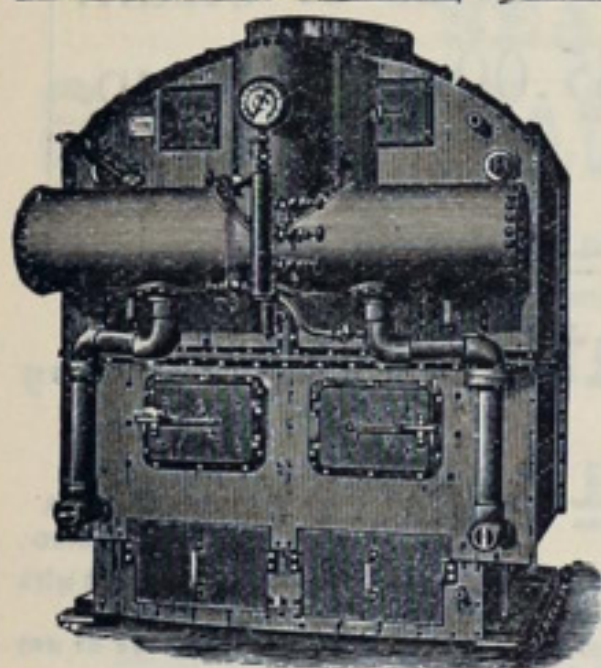
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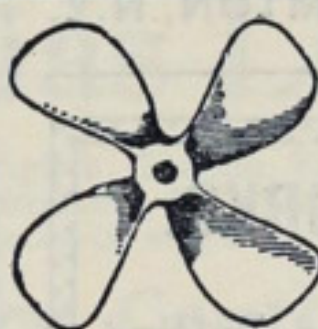
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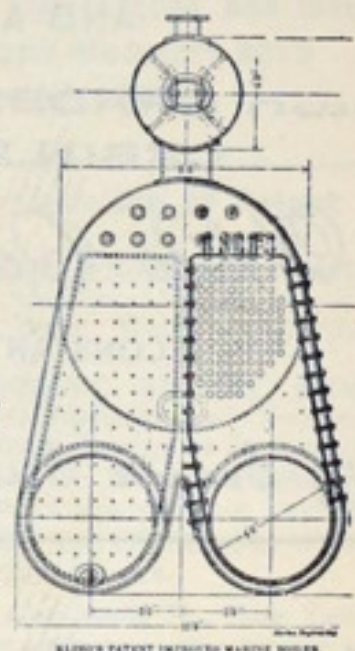
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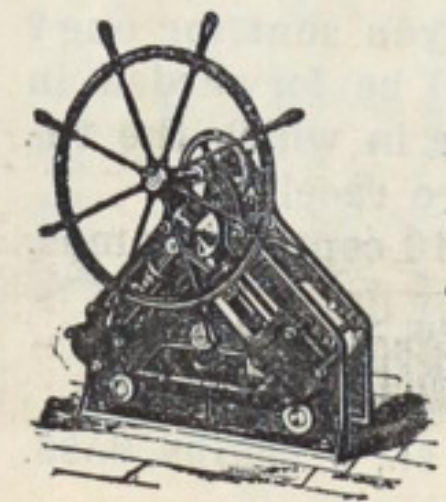
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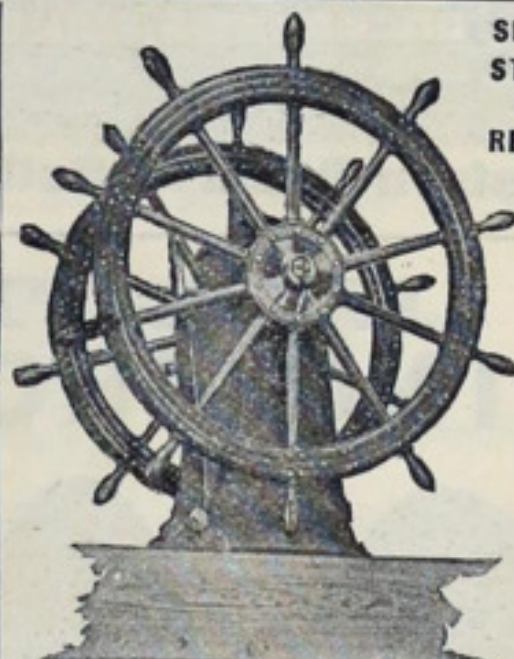
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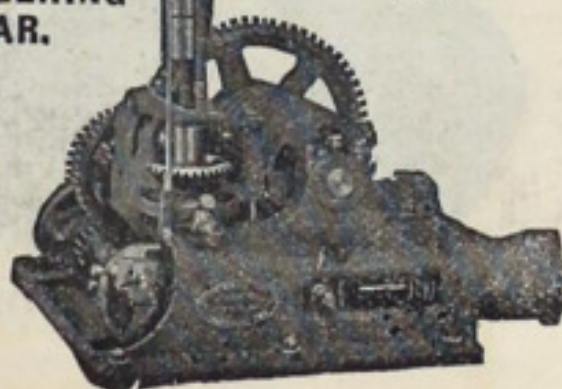


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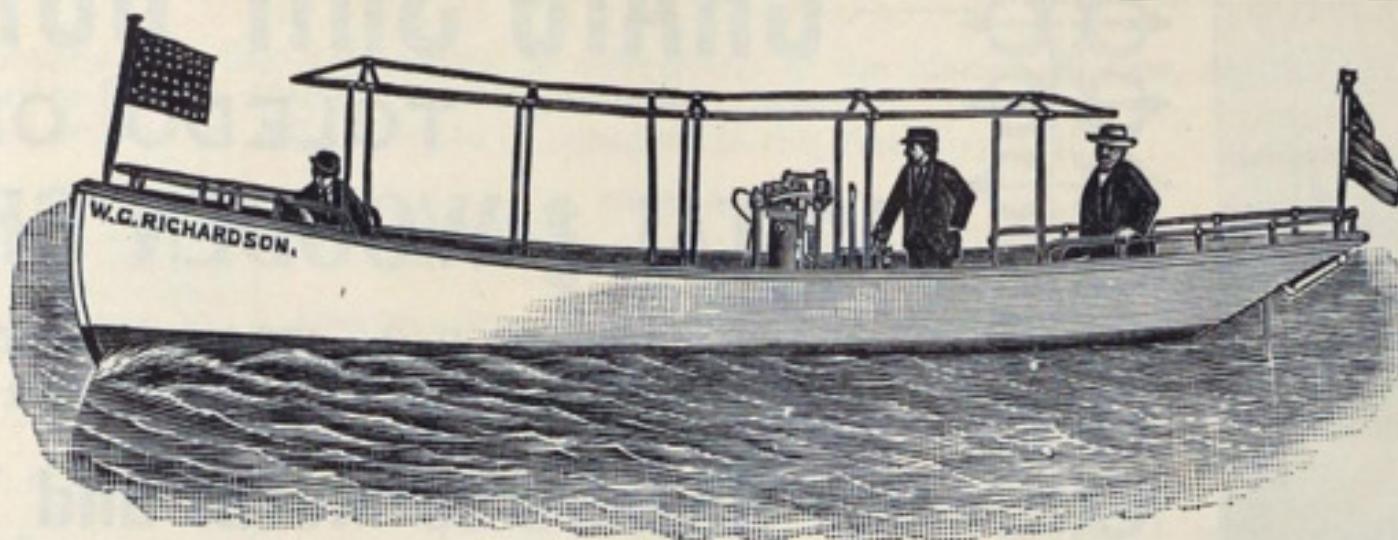


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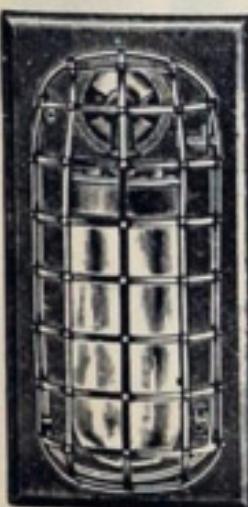
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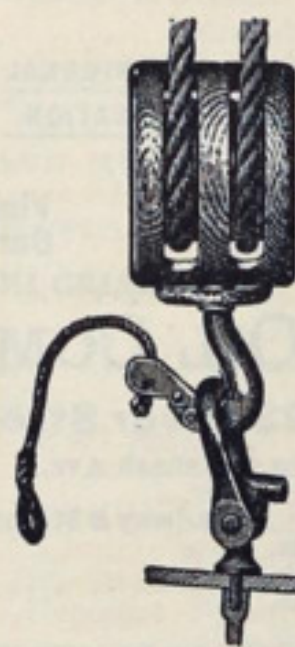


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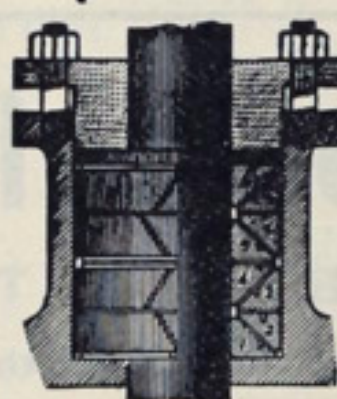
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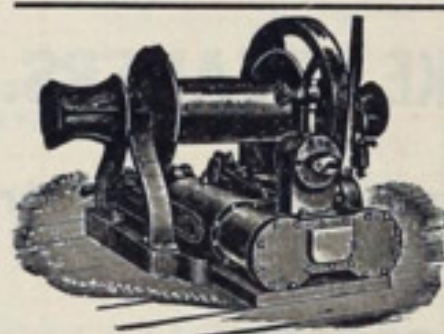
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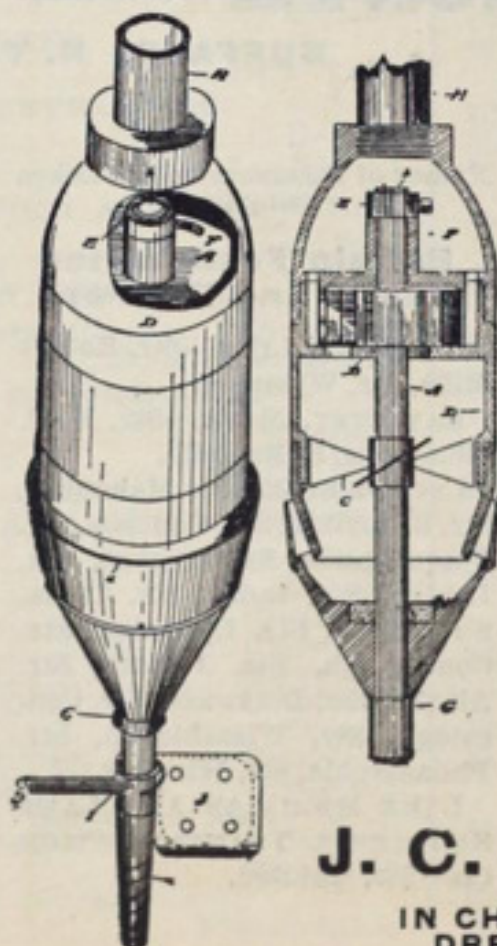
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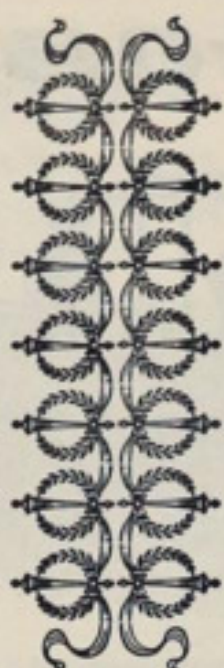
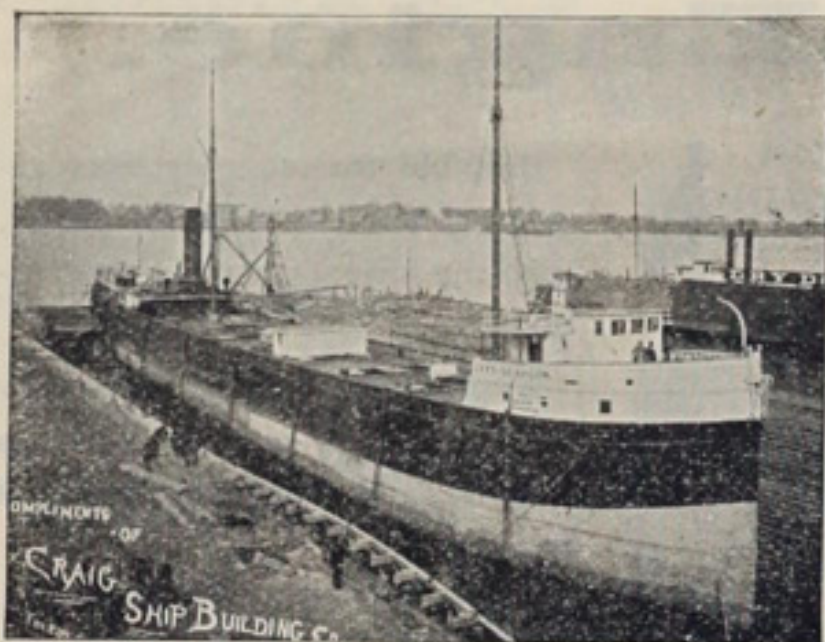
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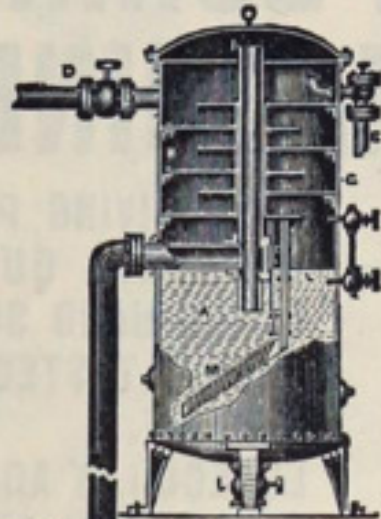
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Armstrong Cork Co.....Pittsburgh, Pa.

DIVING APPARATUS.

A. J. Morse & Son.....Boston.

DREDGING AND DOCK CONTRACTORS.

W. A. McGillis & Co.....Cleveland.
Cleveland Dredge Co.....Cleveland.

DRY DOCKS.

American Steel Barge Co.....West Superior, Wis.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Detroit Dry Dock Co.....Detroit.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Bldg. & Dry Dock Co.....Newport News, Va.
Ship Owners' Dry Dock Co.....Cleveland.
Cleveland Ship Building Co.....Lorain.
Union Dry Dock Co.....Buffalo.

ENGINE BUILDERS, MARINE.

Farrar & Trefts.....Buffalo.
W. & A. Fletcher Co.....Hoboken, N. J.
Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated.....New York.
S. F. Hodge & Co.....Detroit.
Mackinnon Mfg. Co.....Bay City, Mich.
Roach's Ship Yard.....Chester, Pa.
B. F. Sturtevant Co.....Boston.
Globe Iron Works Co.....Cleveland.
Cleveland Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
H. G. Trout.....Buffalo.
Dry Dock Engine Works.....Detroit.
American Steel Barge Co.....West Superior, Wis.
Chicago Ship Building Co.....Chicago.
Sheriffs Mfg. Co.....Milwaukee.

ENGINE ROOM TELEGRAPH.

Chas. Cory & Son.....New York.
Chadburn & Son.....11 Waterloo Rd., Liverpool.

ENGINEERS' SUPPLIES.

Detroit Sheet Metal & Brass Works.....Detroit.
Chase Machine Co.....Cleveland.

ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.
B. F. Sturtevant Co.....Boston.

ELECTRIC HOISTS.

General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.

ENGINEERS, CONSULTING (MECHANICAL AND MARINE).

Miers Coryell.....New York.
John Haug.....Philadelphia.
Ambrose V. Powell.....Chicago.
W. J. Wood.....Chicago.
Walter Miller.....Cleveland.
Joseph R. Oldham.....Cleveland.

FORGES FOR RIVET HEATING.

Crumlish Forge Co.....Buffalo.

EOPHONES.

Eophone Co.....New York.

FANS FOR VENTILATION.

American Blower Co.....Detroit.
B. F. Sturtevant Co.....Boston.

FEED WATER PURIFIER AND HEATERS.

Robert Learmonth.....Buffalo.

FORGINGS, IRON AND STEEL.

Cleveland City Forge & Iron Co.....Cleveland.
Bethlehem Iron Co.....South Bethlehem.

FORWARDERS OF FREIGHT.

Thomas Wilson.....Cleveland.
C. H. Tucker.....Cleveland.
Bessemer Steamship Co.....Cleveland.

FUELING COMPANIES AND COAL DEALERS.

Cuddy-Mullen Coal Co.....Cleveland.
James Graham & Co.....Detroit.
M. A. Hanna & Co.....Cleveland.
Mark H. Hanlon.....Cleveland.
Pickands, Mather & Co.....Cleveland.
O. S. Richardson Fueling Co.....Chicago.
Stanley B. Smith & Co.....Detroit.
Pittsburgh & Chicago Gas Coal Co.....Cleveland.
Rochester & Pittsburgh Coal & Iron Co.....Buffalo.
Port Royal Dock Co.....Sault Ste. Marie, Mich.
Youghiogheny & Lehigh Coal Co.....Chicago.
Osborne, Saeger & Co.....Cleveland.
Castner, Curran & Bullitt (Pocahontas).....Philadelphia.

FLAGS AND BUNTING.

See ship chandlers.

FIXTURES FOR LAMPS, OIL AND ELECTRIC.

Wm. Porter's Sons.....New York.
Page Bros. & Co.....Boston.

FURNACES FOR BOILERS.

Continental Iron Works.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

GAS ENGINES.

McMyler Mfg. Co.....Cleveland.

GLASSES, MARINE.

See ship chandlers and dealers in nautical instruments.

GAUGES, STEAM.

Crosby Steam Gauge & Valve Co.....Boston.
See also valves and engineers' supplies.

GRAPHITE.

Joseph Dixon Crucible Co.....Jersey City, N. J.

GREASE CUPS.

See engineers' supplies.

HEATERS, STEAM.

American Blower Co.....Detroit.

HARDWARE, MARINE.

L. W. Ferdinand & Co.....Boston.
Detroit Sheet Metal & Brass Works.....Detroit.

HOISTING ENGINES.

Chase Machine Co.....Cleveland.
S. F. Hodge & Co.....Detroit.
Jackson & Church.....Saginaw.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City.
Globe Iron Works Co.....Cleveland.
Williamson Bros.....Philadelphia.
Hyde Windlass Co.....Bath, Me.

HOSE FOR DECK AND FIRE PURPOSES.

The Manhattan Rubber Mfg. Co.....New York, Cleveland and Chicago.

HAMMERS, POWER DROP.

Chase Machine Co.....Cleveland.

INDICATORS, CALL BELLS.

Chas. Cory & Son.....New York.
Chadburn & Sons.....11 Waterloo Rd., Liverpool.

INJECTORS.

Jenkins Bros.....New York.

INSURANCE, MARINE.

Chas. E. & W. F. Peck.....New York and Chicago.
Johnson & Higgins, represented by
F. P. Gordon.....Buffalo.
Insurance Co. of North America, represented by
Geo. L. McCurdy.....Chicago.
Brown & Co.....Buffalo.
C. W. Elphicke & Co.....Chicago.
J. G. Keith & Co.....Chicago.
La Salle & Co.....Duluth.
Parker & Millen.....Detroit.
Mitchell & Co.....Cleveland.
W. C. Richardson.....Cleveland.
Hawgood & Moore.....Cleveland.
John Gordon & Co.....Buffalo.
Drake & Maytham.....Buffalo.
Hutchinson & Co.....Cleveland.
C. R. Jones & Co.....Cleveland.
J. H. Bartow.....Cleveland.

IRON ORE AND PIG IRON.

M. A. Hanna & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LIFE PRESERVERS, LIFE BOATS, BUOYS, RAFTS, ETC.

Armstrong Cork Co.....Boston.
Detroit Sheet Metal & Brass Works.....Detroit.
Thos. Drein & Son.....Wilmington, Del.
D. Kahnweiler.....New York.

LIGHTS, PORTABLE, SELF-CONTAINED.

The Wells Light Mfg. Co.....New York.

LIGHTS, SIDE AND SIGNAL.

Page Bros. & Co.....Boston.
Wm. Porter's Sons.....New York.

MANILA ROPE.

Upson-Walton Co.....Cleveland.
H. H. Baker & Co.....Buffalo.

MARINE GLASSES, BAROMETERS, ETC.

L. Black & Co.....Detroit.
John Bliss & Co.....New York.
Also most of the ship chandlers.

METALLIC PACKING.

U. S. Metallic Packing Co.....Philadelphia.
L. Katzenstein & Co.....New York.

MARINE TELEGRAPH.

Chas. Cory & Son.....New York.

Chadburn & Son.....11 Waterloo Rd., Liverpool.

METALS FOR BEARINGS.

Magnolia Metal Co.....New York.
Phosphor Bronze Smelting Co., Ltd.....Philadelphia.

MAGNOLIA METAL.

Magnolia Metal Co.....New York.

METALLIC LIFE BOATS.

Thos. Drein & Son.....Wilmington, Del.
D. Kahnweiler.....New York.

MARINE GLUE.

L. W. Ferdinand & Co.....Boston.

NAUTICAL INSTRUMENTS.

John Bliss & Co.....New York.
L. Black & Co.....Detroit.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

NAPHTHA LAUNCHES.	
Gas Engine & Power Co.....	New York.
NAVAL ARCHITECTS.	
Frank E. Kirby	Detroit.
W. J. Wood	Chicago.
John Haug	Philadelphia.
Joseph R. Oldham	Cleveland.
Robert Curr	Cleveland.
OAK TIMBER AND PLANK.	
Martin-Barriss Co.	Cleveland.
OILS AND LUBRICANTS.	
Jos. Dixon Crucible Co.....	Jersey City, N. J.
Lake Carriers' Oil Co.....	Cleveland.
Standard Oil Co.	Cleveland.
PATENT ATTORNEY.	
Wm. M. Monroe.....	Cleveland.
PASSENGER AND FREIGHT STEAMSHIP LINES.	
Cleveland & Buffalo Transit Co.....	Cleveland.
Detroit & Cleveland Navigation Co.....	Detroit.
Goodrich Transportation Co.	Chicago.
Lackawanna-Green Bay Line, C. H. Tucker.....	Cleveland.
Lake Michigan & Lake Superior Trans. Co.....	Chicago.
Northern Steamship Co.	Buffalo.
Ogdensburg Transit Co.....	Ogdensburg, N. Y.
Northern Transit Co.....	Cleveland.
Graham & Morton Trans. Co.....	Chicago.
PNEUMATIC TOOLS.	
Chicago Pneumatic Tool Co.....	Chicago.
POCAHONTAS COAL.	
Castner, Curran & Bullitt.....	Philadelphia.
PROPELLER WHEELS.	
Dry Dock Engine Works	Detroit.
Cleveland Ship Building Co.....	Cleveland.
Globe Iron Works Co.....	Cleveland.
Farrar & Trefts	Buffalo.
S. F. Hodge & Co.....	Detroit.
Phosphor Bronze Smelting Co., Ltd.....	Philadelphia.
Mackinnon Mfg. Co.....	Bay City.
Sheriffs Mfg. Co.....	Milwaukee.
H. G. Trout	Buffalo.
Hyde Windlass Co.....	Bath, Me.
PRESSURE REGULATORS AND REDUCING VALVES.	
G. M. Davis & Co.....	Chicago.
Foster Engineering Co.....	Newark, N. J.
PACKING.	
A. W. Chesterton & Co.....	Boston.
H. W. Johns Mfg. Co.....	New York.
Jenkins Bros.	New York.
L. Katzenstein & Co.....	New York.
Manhattan Rubber Mfg. Co.....	New York.
U. S. Metallic Packing Co.....	Philadelphia.
Peerless Rubber Mfg. Co.....	New York.
PAINTS.	
Upson-Walton Co.	Cleveland.
Howard H. Baker & Co.....	Buffalo.
PUMPS, STEAM.	
Geo. F. Blake Mfg. Co.....	New York.
Henry R. Worthington.....	New York.
PUMPS, ELECTRIC.	
General Electric Co.....	Schenectady, N. Y.

RELEASING HOOKS FOR DETACHING BOATS.	
Standard Aut. Releasing Hook Co.....	New York.
RIVETS, STEEL.	
Bourne-Fuller Co.	Cleveland.
RUBBER GOODS FOR STEAMERS.	
Manhattan Rubber Mfg. Co.....	New York and Cleveland.
Peerless Rubber Mfg. Co.....	New York.
RUBBER INSULATED WIRES.	
John A. Roebling's Sons Co.....	New York and Cleveland.
SAIL MAKERS.	
Howard H. Baker & Co.....	Buffalo.
Upson-Walton Co.	Cleveland.
SHIP PLATES, STEEL.	
Bourne-Fuller Co.	Cleveland.
SALVAGE COMPANIES.	
See wrecking companies.	
SEARCH LIGHTS.	
General Electric Co.....	Schenectady, N. Y.
SURVEYORS, MARINE.	
Robert Curr	Cleveland.
Capt. D. McLeod	Cleveland.
Joseph R. Oldham	Cleveland.
SHIP CHANDLERS.	
Howard H. Baker & Co.....	Buffalo.
Upson-Walton Co.	Cleveland.
SOUND DETECTORS.	
Eophone Co.	New York.
STEAM, VACUUM AND HYDRAULIC SPECIALTIES.	
William Craig	New York.
SHIP BUILDERS.	
American Steel Barge Co.....	West Superior, Wis.
Craig Ship Building Co.....	Toledo, O.
Chicago Ship Building Co.....	Chicago.
Detroit Dry Dock Co.....	Detroit.
Newport News Ship Building & Dry Dock Co.....	Newport News, Va.
Cleveland Ship Building Co.....	Cleveland.
Globe Iron Works Co.....	Cleveland.
Roach's Ship Yard.....	Chester, Pa.
Union Dry Dock Co.....	Buffalo.
STOCKLESS ANCHORS.	
Baldt Anchor Co.....	Chester, Pa.
International Anchor Co.....	Cleveland.
STEERING ENGINES.	
Pawling & Harnischfeger	Milwaukee.
Sheriffs Mfg. Co.....	Milwaukee.
Chase Machine Co.....	Cleveland.
Globe Iron Works Co.....	Cleveland.
Williamson Bros.	Philadelphia.
Hyde Windlass Co.....	Bath, Me.
STEAM VESSELS FOR SALE.	
Samuel Holmes.....	New York.
STEAM HAMMERS, RIVETING MACHINES.	
Bement, Miles & Co.....	Philadelphia.
TRAPS, STEAM.	
Wm. S. Haines Co.....	Philadelphia.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.	
Bement, Miles & Co.....	Philadelphia.
Chicago Pneumatic Tool Co.....	Chicago.
Hilles & Jones Co.....	Wilmington, Del.
TOWING MACHINES.	
American Ship Windlass Co.....	Providence, R. I.
TOWING COMPANIES.	
Barry Bros. Independent Tug Line.....	Chicago.
Escanaba Towing & Wrecking Co.....	Escanaba, Mich.
The Vessel Owners' Towing Co.....	Cleveland.
TUBING, COPPER AND BRASS.	
Randolph & Clowes	Waterbury, Conn.
VALVES.	
Crosby Steam Gauge & Valve Co.....	Boston.
Jenkins Bros.	New York.
G. M. Davis Co.....	Chicago.
Foster Engineering Co.....	Newark, N. J.
VESSEL AND FREIGHT AGENTS.	
Brown & Co.	Buffalo.
J. H. Bartow	Cleveland.
Drake & Maytham	Buffalo.
C. W. Elphicke & Co.....	Chicago.
John Gordon & Co.....	Buffalo.
Hawgood & Moore	Cleveland.
Hutchinson & Co.	Cleveland.
C. R. Jones & Co.....	Cleveland.
Mitchell & Co.	Cleveland.
W. C. Richardson	Cleveland.
Samuel Holmes	New York.
WIRE ROPE.	
John A. Roebling's Sons Co.....	New York and Cleveland.
Upson-Walton Co.	Cleveland.
H. H. Baker & Co.....	Buffalo.
Phosphor Bronze Smelting Co., Ltd.....	Philadelphia.
WHISTLES, STEAM.	
Crosby Steam Gauge & Valve Co.....	Boston.
WINDLASSES.	
American Ship Windlass Co.....	Providence, R. I.
Hyde Windlass Co.....	Bath, Me.
Globe Iron Works Co.....	Cleveland.
WINCHES.	
American Ship Windlass Co.....	Providence, R. I.
Hyde Windlass Co.....	Bath, Me.
WRECKING AND SALVAGE COMPANIES.	
Escanaba Towing & Wrecking Co.....	Escanaba, Mich.
Donnelly Salvage & Wrecking Co.....	Kingston, Ont.
Swain Wrecking Co.	Detroit.
Vessel Owners' Towing Co.....	Cleveland.
YACHT BOILERS.	
Detroit Screw Works.....	Detroit.
YACHT PLUMBERS.	
Alfred B. Sands & Son.....	New York.
YACHT AND BOAT BUILDERS.	
Thos. Drein & Son.....	Wilmington, Del.
Gas Engine & Power Co.....	New York.
YACHT, BOAT AND CANOE HARDWARE.	
L. W. Ferdinand & Co.....	Boston.
YAWLS.	
Thos. Drein & Son.....	Wilmington, Del.

Alphabetical List of Marine Review Advertisers.

The star (*) indicates that the advertisement appears alternate weeks.

Almy Water Tube Boiler Co.....	22	Detroit Sheet Metal & Brass Works	19	Kahnweiler, D.	22	Powell, Ambrose V.....	4
American Blower Co.....	28	Detroit & Cleveland Navigation Co.	27	Katzenstein, L. & Co.....	23	Port Royal Dock Co.....	5
American Ship Windlass Co.....	2	Dixon, Jos., Crucible Co.....	21	Keith, J. G. & Co.....	18	Porter's, Wm., Sons.....	19
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Armstrong Cork Co.....	28	Drake & Maytham.....	4	Lackawanna-Green Bay Line.....	4	Randolph & Clowes.....	1
Babcock & Wilcox Co.....	7	Drein, Thos. & Son.....	19	L. S. & M. S. Ry.....	27	Richardson, W. C.....	4
Baldt Anchor Co.....	20	Dry Dock Engine Works.....	3	*Lake Carriers' Oil Co.....	20	Richardson, O. S., Fueling Co.....	8
Barry Bros. Independent Tug Line..	7	Elphicke, C. W. & Co.....	4	La Salle & Co.....	18	Roach's Ship Yard.....	18
Baker, Howard H. & Co.....	21	Eophone Co.	5	*Learmonth, Robert	24	Roberts Safety Water Tube Boiler	
Bartow, J. H.....	4	Escanaba Towing & Wrecking Co...	19	Lidgerwood Mfg. Co.....	5	Co.	19
Bement, Miles & Co.....	22	Farrar & Trefts.....	27	McGillis & Co., W. A.....	8	*Roebling's, John A., Sons Co.....	28
Berlin Iron Bridge Co.....	22	Farasey & Marron.....	23	McKay, James & Co.....	17	Rochester & Pittsburgh Coal &	
Bessemer Steamship Co.....	18	Ferdinand, L. W. & Co.....	21	McLeod, D.	4	Iron Co.	19
Bethlehem Iron Co.....	6	Fletcher, W. & A. Co.....	28	McMyler Mfg. Co.....	23	Safety Car Heating & Lighting Co.	20
Bourne-Fuller Co.	8	Foster Engineering Co.....	5	Mackinnon Mfg. Co.....	22	Sands, Alfred B. & Son.....	22
Blake, Geo. F., Mfg. Co.....	1	Gas Engine & Power Co. and Chas.		Magnolia Metal Co.....	1	Sheriffs Mfg. Co.....	22
*Bliss, John & Co.....	24	L. Seabury & Co., Consolidated..	20	Manhattan Rubber Mfg. Co.....	18	Shelby Steel Tube Co.....	5
Bloomsburg, H. & Co.....	7	General Electric Co.....	6	Marine Iron Co.....	23	Ship Owners' Dry Dock Co.....	28
Brown & Co.....	18	Gilchrist, Albert J.....	4	Martin-Barriss Co.	21	Smith, Stanley B. & Co.....	8
Brown & Co.....	4	Globe Iron Works Co.....	1	Miller, Walter	20	Standard Oil Co.....	24
Brown Hoisting & Conveying Ma-		Goulder, Harvey D.....	4	Monroe, Wm. M.....	4	Standard Brass Works.....	18
chine Co.	2	Gordon, John & Co.....	4	Mackey & Bell	4	Standard Automatic Releasing	
Brown, Harvey L.....	4	Graham, James & Co.....	5	Milwaukee Dry Dock Co.....	28	Hook Co.	23
Carr, J. B. Co.....	21	Haines, Wm. S. & Co.....	8	Mitchell & Co.....	4	Sturtevant, B. F. Co.....	28
Castner, Curran & Bullitt.....	27	Hanna, M. A. & Co.....	19	Morse, A. J. & Son.....	22	Swain Wrecking Co.....	23
*Chesterton, A. W. & Co.....	20	Hanlon, Mark H.....	5				
*Chadburn & Sons.....	28	Haug, John	4	Newport News Ship Building &			
Chase Machine Co.....	5	Hawgood & Moore.....	4	Dry Dock Co.....	18		
Chicago Pneumatic Tool Co.....	20	Hayden, P. S. H. Co.....	19	New York, Chicago & St. Louis Ry.	24		
Chicago Ship Building Co.....	2	Herriman, F. D.....	18	Northern Steamship Co.....	4		
Cleveland City Forge & Iron Co.....	7	*Hilles & Jones Co.....	6				
Cleveland Ship Building Co.....	1	Hodge, S. F. & Co.....	7	Ohio Supply Co.....	21		
Cleveland & Buffalo Transit Co.....	27	Holmes, Samuel	4	Oldham, J. R.....	4		
C. C., C. & St. L. Ry.....	27	Hoyt, Dustin & Kelley.....	4	Ogdensburg Transit Co.....	4		
Continental Iron Works.....	2	Hutchinson & Co.....	4				
Coryell, Miers	4	Hyde Windlass Co.....	28	Page Bros. & Co.....	23		
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*Craig Ship Building Co.....	24	International Anchor Co.....	21	Pawling & Harnischfeger.....	22		
Craig, William	20	Jackson & Church.....	23	Peck, Charles E. & W. F.....	18		
Crosby Steam Gauge & Valve Co...	8	Jenkins Brothers	8-22	Peerless Rubber Mfg. Co.....	8		
Cuddy-Mullen Coal Co.....	6	Johns, H. W. Mfg. Co.....	1	Phosphor Bronze Smelting Co., Ltd.	8		
Curr, Robert	4	Johns, H. & Higgins.....	6	Pickands, Mather & Co.....	21		
Crumlish Forge Co.....	6	Jones, C. R. & Co.....	4	Pinney, Orestes C.....	4		
Detroit Dry Dock Co.....	1			Pittsburgh & Chicago Gas Coal Co.	19		
Detroit Screw Works.....	19					Youghlopheny & Lehigh Coal Co....	19

WHAT DO YOU PAY

FOR A HORSE POWER?

THAT'S THE IMPORTANT QUESTION
AMONG SHIP OWNERS.

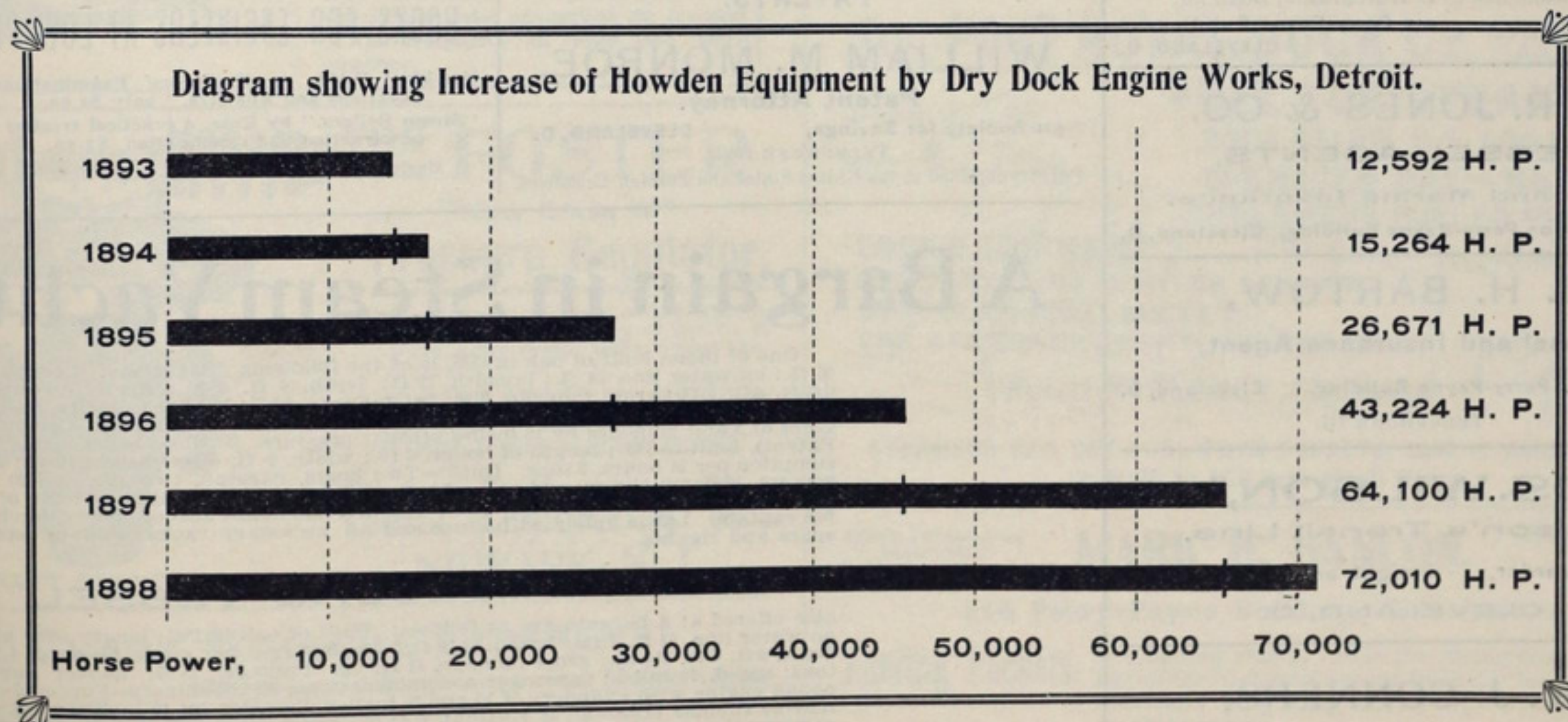
A UNIT OF POWER FOR A POUND AND A HALF OF COAL PER HOUR !

SUCH IS THE RECORD OF A MODERN FREIGHTER, THE WESTERN
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QUADRUPLE EXPANSION ENGINES AND

HOWDEN HOT DRAFT.

MORE ADDITIONS ARE MADE IN THE LIST OF HOWDEN SHIPS, REVISED TO DATE
IN THE FOLLOWING SUMMARY:

	STEAMERS.	HORSE POWER.
Total installations of Howden draft throughout the world,	814	2,277,300
Total installations by Dry Dock Engine Works, Detroit,	58	72,010



CONSULT DRY DOCK ENGINE WORKS, DETROIT, MICH.

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C. W. ELPHICKE & CO.

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C. W. ELPHICKE. Room 10, No. 6 Sherman St.,
JAS. A. MYERS. CHICAGO, ILL.
CALVIN CARR.**MITCHELL & CO.**

Vessel and Insurance Agents,

508, 509 & 510 Perry-Payne Building, Cleveland, O.
Office Telephone 767. Residence, John Mitchell, Doan 341.
John F. Wedow, 158 L. Alfred Mitchell, Doan 197 J.**W. C. RICHARDSON,**

VESSEL AND MARINE INSURANCE AGENT,

Office Telephone 338. Residence Telephone 2938.
606 and 607 Perry-Payne Bldg., Cleveland, O.**BROWN & CO.**

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J. W. MOORE.

HAWGOOD & MOORE,

Vessel and Insurance Agents,

Residence Phone, Doan 416—W. A. Hawgood.
Long Distance Tel. 2395.
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Vessel, Freight and Insurance Agents,

JOHN GORDON. 1132 Guaranty Building,
J. H. KELLERAN. BUFFALO, N. Y.
H. L. CHAMBERLIN.CAPT. M. M. DRAKE, G. W. MAYTHAM,
Long Distance Telephone: Long Distance Telephone:
Office, Seneca 81. Office, Seneca 1660.
Residence, Bryant 431. Residence, 2615 Bryant.**DRAKE & MAYTHAM,**

Vessel and Insurance Agents,

No. 1 Main Street, BUFFALO, N. Y.

LAKE TRANSPORTATION C. H. TUCKER,

General Agent,

LINES REPRESENTED The Northern Steamship Company,
Lackawanna Green Bay Line,
Ogdensburg Transit Co.
Office, Dock and Warehouse, Lake Front, Foot of Water Street.**HUTCHINSON & CO.**

Vessel and Insurance Agents.

Office Telephone, Main 2453.
Residence C. L. Hutchinson, Doan 19J.C. L. HUTCHINSON. 412 Perry-Payne Building,
W. H. MCGEAN. CLEVELAND, O.**C. R. JONES & CO.**

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Fire and Marine Insurance,

501, 502 & 503 Perry-Payne Building, Cleveland, O.

J. H. BARTOW,

Vessel and Insurance Agent,

611 and 612 Perry-Payne Building, Cleveland, O.
TELEPHONE 717.**THOS. WILSON, Managing Owner**

Wilson's Transit Line.

Gen. Forwarder, Freight and Vessel Agent,
CLEVELAND, O.**W. J. CONNERS,**OFFICES—
BUFFALO,
CHICAGO,
MILWAUKEE,
GLADSTONE.

Contractor,

BUFFALO, N. Y.

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SAMUEL HOLMES,

Steamship Offices,

For Selling, Chartering and Building all classes Steam Vessels.

Steam Vessel Circulars. Weekly Freight Circulars.

Morris Building, 66 & 68 Broad Street, NEW YORK.

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Lawyer and Proctor in Admiralty,

CLEVELAND, O.

ALBERT J. GILCHRIST,

PROCTOR IN ADMIRALTY,

604 Perry-Payne Building, CLEVELAND, O.

HARVEY L. BROWN,Counselor at Law and
Proctor in Admiralty,

35 White Building, BUFFALO, N. Y.

HOYT, DUSTIN & KELLEY,LAWYERS and
PROCTORS IN ADMIRALTY,

Offices, 702 Western Reserve Bldg., Cleveland, O.

White, Johnson, McCaslin & Cannon,ATTORNEYS AT LAW and
PROCTORS IN ADMIRALTY,

Blackstone Bldg., Cleveland, O.

ORESTES C. PINNEY,

Lawyer and Proctor in Admiralty,

Rooms 316 and 317 Perry-Payne Building,
Telephone Main 2585. CLEVELAND, O.

W. F. MACKEY.

URBAN C. BELL.

MACKEY & BELL,ATTORNEYS AND COUNSELORS AT LAW,
PROCTORS IN ADMIRALTY.1020-1022 PRUDENTIAL BLDG.,
BUFFALO, N. Y. TELEPHONE, SENECA 1314.

PATENTS.

WILLIAM M. MONROE,

Patent Attorney.

511 Society for Savings, CLEVELAND, O.
TELEPHONE 2683.

Patents obtained in the United States and Foreign Countries.

PROFESSIONAL.

W. J. WOOD, Naval Architect,

Ship Surveyor,

Consulting Engineer.

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs.

Vessels designed—Twin S.S. Virginia, Steam Yacht Comanche, Twin S.S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

Complete plans furnished for
Steel Composite or Wooden Vessels.Office on Goodrich Dock, CHICAGO, ILL.
foot of Michigan Ave.,**MIERS CORYELL,**

Consulting Mechanical Engineer.

Plans, Specifications and Superintendence.
Marine and Water Works Engines and Boilers.

21 East Twenty-first Street, NEW YORK.

JOSEPH R. OLDHAM,

Engineer and Naval Architect.

Designs Steam Vessels, Marine Engines and Boilers,
and Superintends their Construction or Repairs.

814 Perry-Payne Building, CLEVELAND, O.

JOHN HAUG,

Consulting Engineer and Naval Architect.

Ship and Engineer Surveyor Lloyds Register, London.
Plans, Specifications and Superintendence of Ships and their Machinery.
Specialties—Bulk Oil Vessels, High Speed Yacht Engines, etc.
206 Walnut Place, PHILADELPHIA.**D. McLEOD,** MARINE SURVEYOR
and APPRAISEROf Damages and Losses on
Steel and Wooden Vessels.

713 Perry-Payne Bldg., - CLEVELAND, O.

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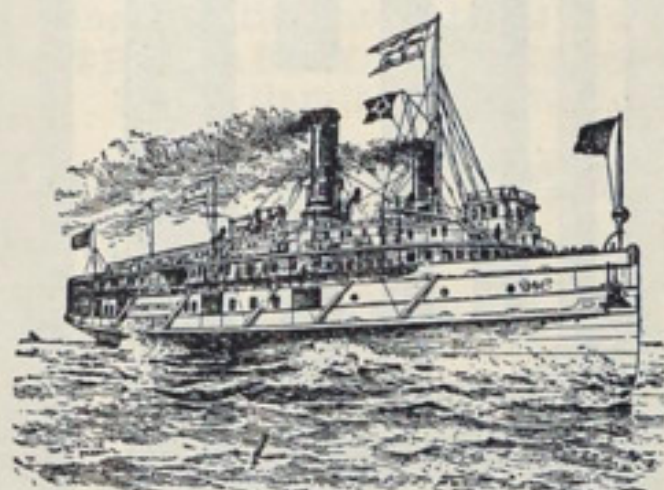
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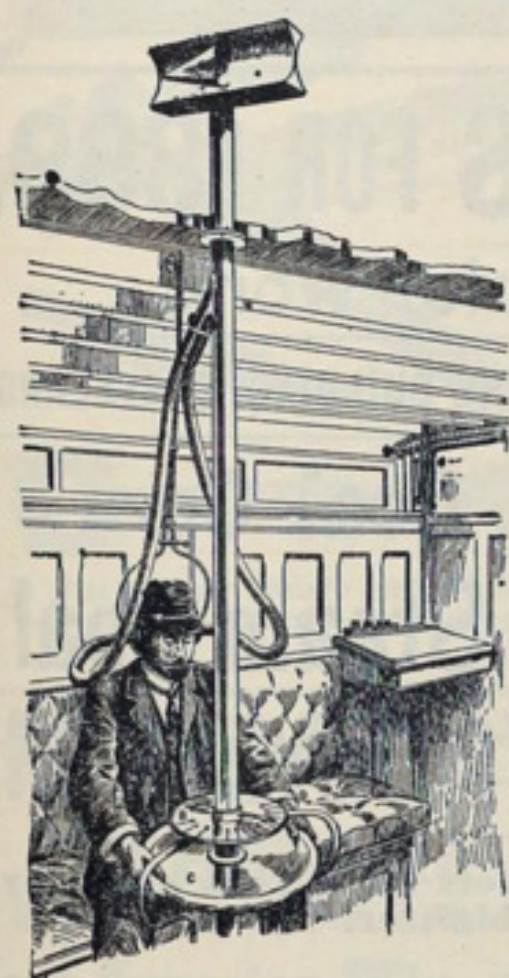
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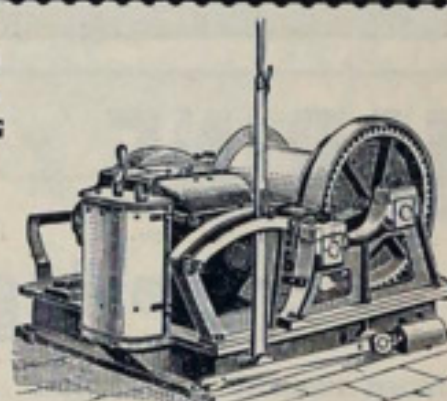
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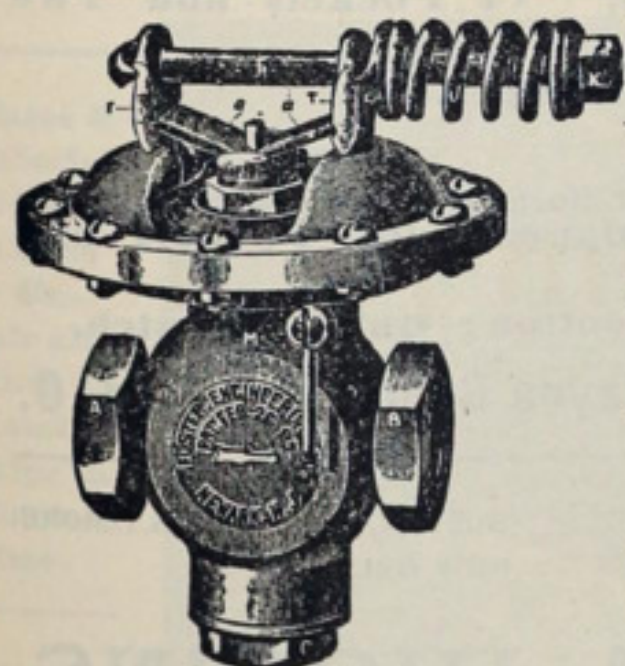
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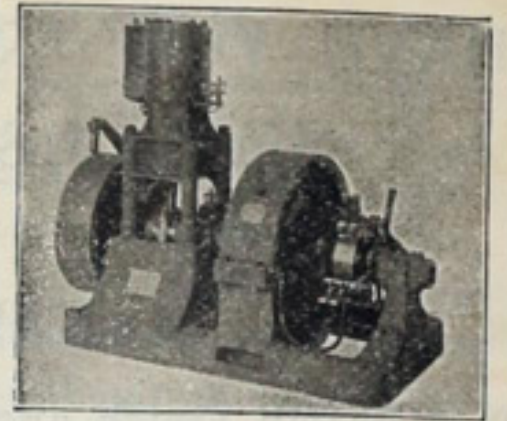
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June 10, 1898.

1. Please forward to the Commanding Officer, U. S. S. 'MARIETTA', Key West, Fla., 8 fire bricks, 4 rights and 4 lefts, No. R. 3440, Babcock & Wilcox boilers, to replace broken bricks between furnace doors.
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THE BABCOCK & WILCOX CO.,
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Respectfully,

(Sig.) EDWIN STEWART, Paymaster General,
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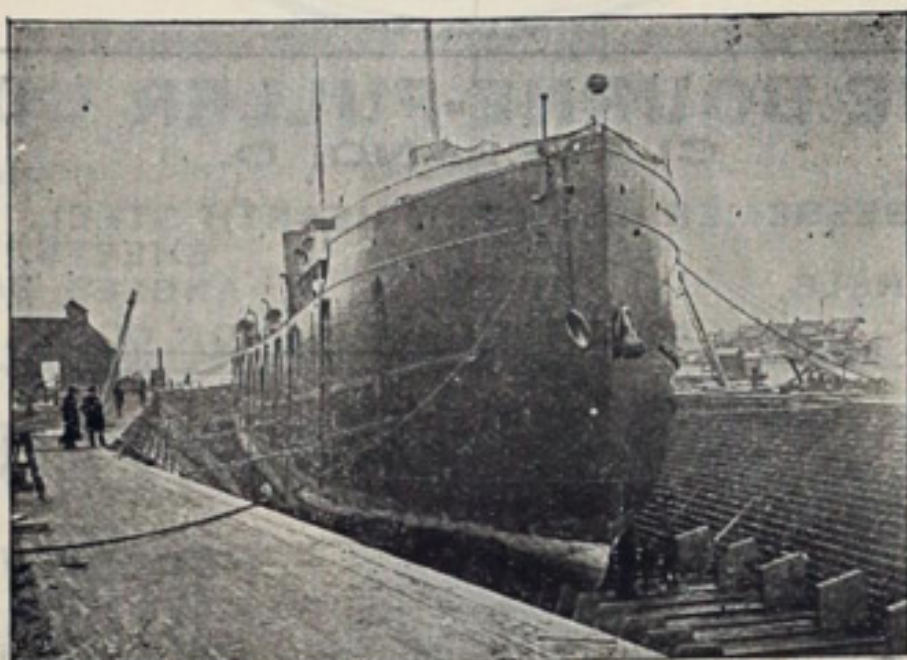


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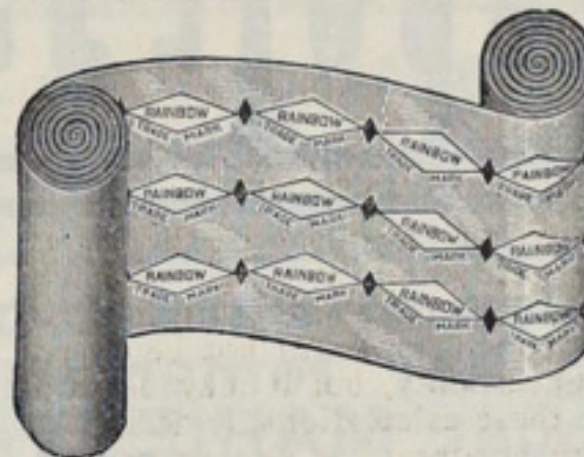
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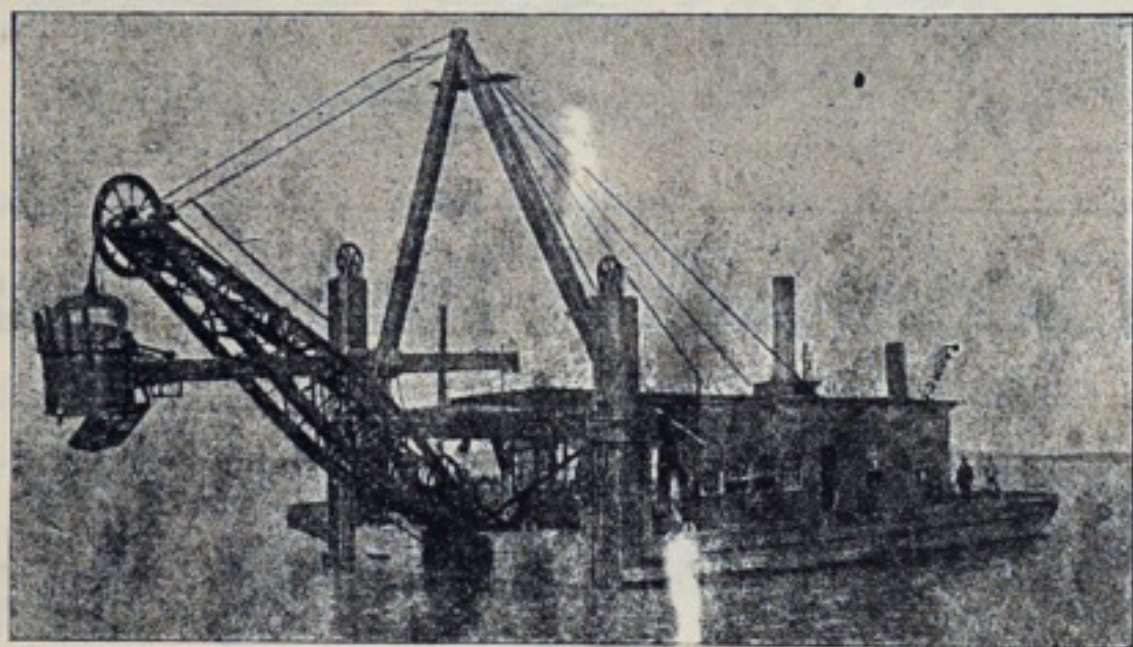
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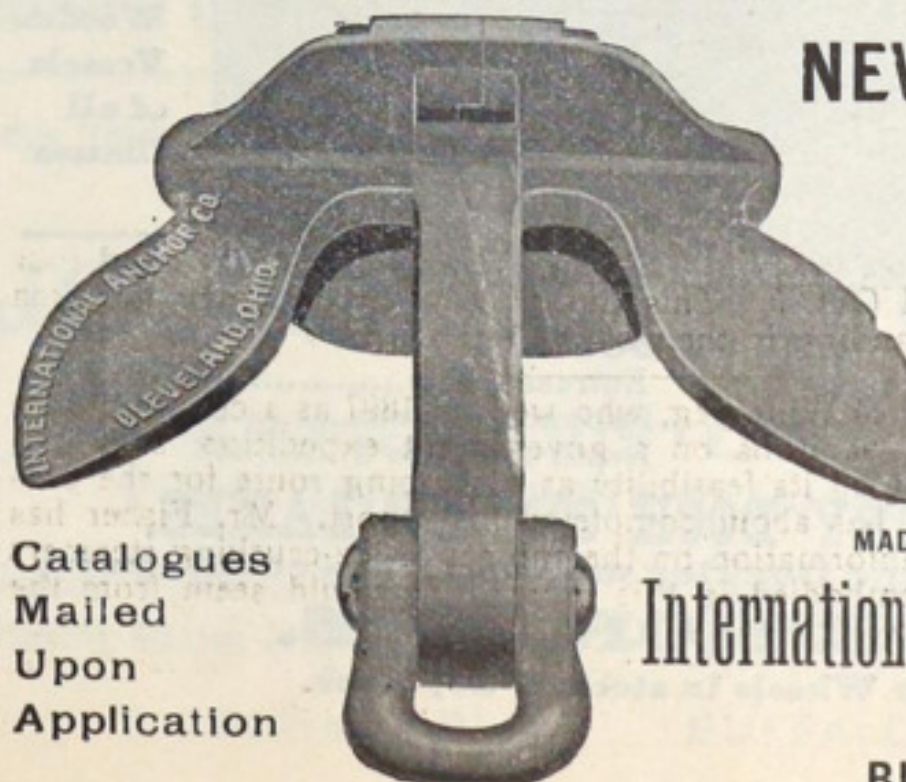
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